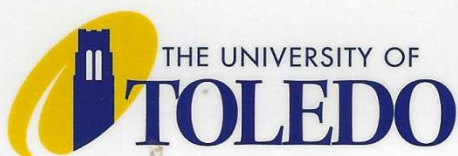




LACUS FORUM XXIX

***Linguistics and
the Real World***



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XXIX**

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*Linguistics and
the Real World*

Edited by

**Douglas W. Coleman,
William J. Sullivan &
Arle R. Lommel**



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PREFACE

THE TWENTY-NINTH FORUM OF THE Linguistic Association of Canada and the United States (LACUS) was held at the University of Toledo, Toledo, Ohio, from July 30 to August 3, 2002. This was the first, but I hope by no means the last, LACUS conference to be hosted here in Toledo.

This year my co-editors (William J. Sullivan and Arle Lommel) and I decided to break from past practice in terms of the organization of the volume. Rather than following a more traditional breakdown into sections on phonetics, phonology, syntax, discourse, historical linguistics, and so on, we thought that the conference focus on 'Linguistics and the Real World' suggested that something quite different might be more appropriate. Thus, we have categorized the published papers into two main sections: the first—Applying Linguistics to the Real World—includes papers that primarily deal with *real-world applications* of linguistics, while the second—Understanding Linguistics through the Real World—contains papers that use *real-world data* in the creation of linguistic theories. While on its face this looks like the traditional distinction between applied and theoretical linguistics, the distinction is meant instead to highlight the close relationship between theory and application. Of course the distinction between the two is not always clear since the best theory has practical implications and the best applications have theoretical implications, but we hope the distinction will have benefit for readers.

Like my predecessors, I must note the long-standing LACUS tradition of welcoming and encouraging the work of young scholars in the field of linguistics. To this end, LACUS awards Presidents' Pre-doctoral and Post-doctoral Prizes to the best papers presented by scholars in each of those categories. Judging of the papers is performed by the current LACUS president and all former presidents of the organization present at the conference. The 2002 Presidents' Postdoctoral Prize was awarded to Timothy Face, University of Minnesota, for his paper titled 'Consonant strength innovations across the Spanish-speaking world: Evidence and implications for a usage-based model of phonology'. This year, a second postdoctoral paper was also deemed worthy of recognition, and was awarded the Presidents' Postdoctoral Commendation; this went to David Cahill, University of Illinois at Chicago, for his paper on 'Lookup and input methods for Chinese characters: Electronic versus paper media'. The Presidents' Pre-doctoral Prize went to Monica Ward, Dublin City University, for her paper, 'How CALL can help language revitalisation: The case of Nawat'.

In the spirit of this year's LACUS conference theme, a day-and-a-half workshop on Hard-Science Linguistics, sponsored by the University of Toledo, immediately preceded the start of LACUS (July 29–30). It was chaired by Victor H. Yngve, University of Chicago.

My sincere thanks go to William J. Sullivan, who has performed the (to me) onerous work of copy-editing the current volume, and to Arle Lommel, who has taken charge of virtually all aspects of mechanical production. I feel that my own responsibilities, those arising from my primary role as coordinator of the review process, have been light by comparison.

Thanks also must go to the many members of the LACUS Editorial Review Board who adjudicated papers for this year's volume.

I quote the LACUS 2002 Resolutions Committee (Connie Eble, Masahiko Komatsu, and John Regan) in giving thanks to Lois Stanford:

LACUS thanks Lois Stanford, recently retired from the University of Alberta, for her excellent service as Conference Coordinator for the annual LACUS Forums at Rice University (2000), the University of Quebec at Montreal (2001), and the University of Toledo (2002), and in particular for perfecting the system for the electronic submission of abstracts and their adjudication.

It would be inconceivable also not to note with sorrow the passing of Ruth Brend, our long-time LACUS colleague who contributed so much to LACUS Forum volumes, as an editor, author, and member of the editorial review committee. Again, I quote the Resolutions Committee, who put it so eloquently:

Ruth Brend died on January 8, 2002, on her seventy-fifth birthday. LACUS held a special place in Ruth's heart, and Ruth held a special place in the hearts of so many who got to know her through her many roles in LACUS. She served as President; local organizer of the LACUS Forums at both East Lansing and Ann Arbor; editor of three *LACUS Forum* volumes; interim Secretary-Treasurer; and for six consecutive years as Conference Coordinator. In that role Ruth enjoyed playing talent scout for the entertainment portion of the banquet, and the cheerful and fun-loving spirit of the annual Presidential Banquet is part of Ruth's legacy to us. It is an honor to LACUS that the resolution of thanks that was adopted at the Presidential Banquet in 1999 was printed as part of the program at Ruth's memorial service at the Christian Reformed Church in Ann Arbor.

Ruth always welcomed newcomers to LACUS and was particularly eager for young scholars and scholars from abroad to have a happy experience. While she was conference coordinator, she persuaded the board to set aside some funds to help scholars from countries with weak currencies to attend the Forum. After her death, many of her LACUS friends contributed to that fund, and it is now called The Ruth Brend Fund in her memory. The Committee on Resolutions moves that this memorial resolution be adopted and posted on the LACUS web page and that a copy be sent to future recipients of grants from The Ruth Brend Fund.

Douglas W. Coleman – Toledo, Ohio – 2003

I

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FEATURED
LECTURES

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PRESIDENTIAL ADDRESS

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THE MYSTERY OF TRANSLATION

ADAM MAKKAI

University of Illinois at Chicago

TOTALLY SUCCESSFUL TRANSLATION, it has been suggested, is not possible at all. Every time we say or write a word in any language, the CONTEXT OF THE SITUATION is different. Even if the name of a city is 'the same' in two related, though distinct languages, say in English and German, such as *London* or *Berlin*, the respective native pronunciations of these well known city names will add a dimension to the *Gesamtbedeutungen* of the words uttered, and they will not be 100% identical. The practical question is, of course, *how different* are even the best translations?

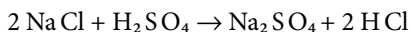
If every time one says *yes* or *no* meaning 'affirmative' and 'negative,' respectively, one would be more of an automaton than a human being. Anyone who has ever seen a theatrical performance on stage knows that *yes* can mean 'no' and *no* can mean 'yes'—the proper understanding of the word itself will depend on how the director has interpreted the author's intentions.

Imagine the following scene: Husband to wife: *Are you tired, honey?* She replies (in an enthusiastic voice, with a flirtatious smile on her face) *No!* I think it is obvious that she means to answer 'yes' to the husband's unspoken but clearly implied subtext, which is to what he has in mind for the rest of the evening.

Translation becomes possible to the extent that the translator, or live speech interpreter, is able to look *behind the dictionary definitions of the words constituting the utterance* in question and reconstruct the context of the situation.

This is undoubtedly much easier in the case of RESTRICTED DOMAIN TEXTS than with LITERATURE, especially interior monologue built on free association and, of course, poetry (cf. Melby 1994, 1995.) Alan Melby's 1995 book grew out of his featured lecture given at the 1993 LACUS Forum in Chicago, and remains to this day one of the most articulate and informative works dealing with translation and, more, the possibility of Language itself.

1. AN EXAMPLE FROM CHEMISTRY. If one's task is to translate an article from any modern language whose state has a university where chemistry is taught, the formula describing the production of hydrochloric acid from kitchen salt with sulfuric acid as the reactant, one can write:



which is to be interpreted as 'sodium chloride (i.e. "kitchen salt") plus sulfuric acid turns into sodium sulfate ("a byproduct used for certain industrial purposes") plus two units of hydrochloric acid.'

Given the fact that this elementary experiment in inorganic chemistry can easily be repeated, whatever translation one cares to provide for this well known process is almost unnecessary, since the result will most likely turn out to be the same. The possibility of error is always there, of course, but due to the heavily restricted domain specificity of the subject of such instances of well-known inorganic chemistry, errors can be almost entirely eliminated.

2. OTHER DOMAIN-SPECIFIC EXAMPLES. Consider the task of translating a birth certificate, a marriage certificate, a death certificate, or a divorce decree. Entire sentences are not even necessary in many cases—one fills in a set of pre-manufactured rubrics such as ‘Father’s Name,’ ‘Mother’s Maiden Name,’ ‘The Newborn’s sex,’ ‘The Newborn’s Given Name and Family Name,’ ‘The parents’ Residence,’ ‘Place of Birth,’ ‘Name of Registering Officer,’ ‘Date of Issuance of Certificate,’ and so forth. Years, months and days are expressible by numbers alone. Difficulties may arise, however, if the location of a birth is in an exotic land and is given in an unfamiliar script, but these facts of a birth can be investigated and once the translator knows how to transliterate the name of the given location, the task is solved.

Pre-nuptial agreements are much more difficult to deal with, because different individuals have different ideas, and thus the requests they make of one another before tying the knot may approach outlandish, even comical proportions that could have been part of a piece of literary fiction. Having said this, I have arrived at what this paper is really about.

3. ORAL INTERPRETATION AND LITERARY TRANSLATION. Oral interpretation must have existed ever since humankind started to speak. Numerous witness accounts tell about speakers of Bantu languages in Africa, who need to spend one, two, three, or several days in the locality of the next tribe, before they feel comfortable communicating with them orally. Thus we have ‘one-day dialects,’ ‘two-day dialects,’ ‘one-week dialects,’ and so forth. Literacy is obviously not a requirement for a successful oral interpreter, although nowadays it is difficult for us to imagine how a preliterate ancient Greek might have communicated with a preliterate ‘barbarian,’ whether the barbarian in question spoke a markedly different version of Greek, such as Aeolic or Doric to a speaker of Attic-Ionic, or to a Phoenician, or an Egyptian. It goes without saying that closely related languages or dialects must have been easier to use for oral interpretation in the preliterate world. A native speaker of German has a much easier time understating Bavarian German, Swabian, or Schwitzerdütsch, than someone who, although fluent in High German, has only acquired second language familiarity with German. The same holds true for the Slavic languages—a native speaker of Russian can make out Serbo-Croatian, Bulgarian or Slovenian with much greater ease than someone whose Russian, no matter how fluent, happens to be academically acquired.

The art of simultaneous interpretation, used at the United Nations and international conferences—for instance from English to Japanese or Mandarin Chinese or *vice versa*—is a demanding and stressful job, and according to well-known statistical

accounts, the suicide rate among simultaneous translators is one of the highest in all language related professions. The simultaneous translators I have spoken to all agree on one important aspect: They must not waste time consciously to think of the best available legal definition of every word they hear, but rather they must grasp the entire set of concepts being put forth and re-express them in understandable sentence form in the target language. Consequently a great deal of ANTICIPATION and INTUITION must be used with heavy concentration on the source language speaker's intent. Years of training allow simultaneous interpreters to overcome the fear and anxiety of making a mistake. If a translation of whatever type is to be accomplished in writing, the translator has much more time to edit the text and choose alternative modes of conveying the intended message. A shortage of time, however, works against the modern simultaneous interpreter and puts such individuals under the heavy stress they must endure.

Translators of literary prose must find the appropriate level of diction, sometimes referred to as the REGISTER of the text, and this can result in miscarried attempts. Also registers change a great deal from one decade to the next, hence the frequent necessity of retranslating a famous work of literature. Think of Leo Tolstoy's *War and Peace* in this regard. The work opens in French, since that was the medium of conversation used by the Russian aristocracy at the time of the Napoleonic Wars. Twentieth century Soviet editions of *War and Peace* have, therefore, often given the beginning passage in Russian translation as an extended footnote, because it was assumed that relatively few Soviet-educated readers would be able to follow Tolstoy's French without a printed pony. French translations of the novel, on the other hand, simply set the opening passage in italics, and add a footnote saying 'this in the original is in French.' English language editions exist both with translated ponies and without.

The art of translation reaches the level of MYSTERY when it comes to poetry.

4. THE CASE OF J.W. GOETHE'S *EIN GLEICHES*, following his *Wandrer's Nachtlied*. One of world literature's most famous and most frequently translated poems is an eight-liner by Johann Wolfgang von Goethe, who among other unique accomplishments, was the first person to have uttered the term *Weltliteratur*, 'world literature.' Memorized by countless native speakers of German as well as students of German as the most beautiful German poem, *Ein Gleiches* ['A Similar One'] following the longer *The Wanderer's Night Song* gives the translator a number of extraordinary challenges. The original goes:

Über allen Gipfeln
ist Ruh';
in allen Wipfeln
spürest du
kaum einen Hauch.
Die Vögelein schweigen im Walde.
Warte nur, balde
ruhest du auch.

Rendered in word-for-word English prose, we receive the following:

‘Over all the mountain peaks
(there) is silence,
in all the tree-crowns
you feel
hardly a breath.
The little birds keep silent in the forest.
Just wait, soon
You too (will) rest.’

That this is no poetic translation needs no elaboration. The dictionary meanings of Goethe’s original are all there, and the non-German reader may rationalize that this text ‘has been properly decoded and understood.’ The words ‘there’ and ‘will’ had to be added to the English prose paraphrase, whereas in German they are not necessary. Our task now becomes this: we need to find out how various translators in various languages have handled this text not just as a sequence of words that describe a melancholy landscape in prose, *but as a poem* that has rhymes, a definite rhythm, and a distinct and uniquely haunting beauty, the very qualities that have immortalized these eight short lines.

The best-known English translation was penned by Henry Wadsworth Longfellow, who wrote:

*O’er all the hilltops
Is quiet now,
In all the treetops
Hearest thou
Hardly a breath;
The birds are silent in the trees.
Wait, soon like these
Thou shalt rest.*

Not a bad solution at all, but the number of syllables per line differs from the original. Longfellow rhymes where Goethe does, but the aesthetic sensation of the poem is markedly different from the original. Line 4 starts the trouble: *hearest thou* was antiquated English even in Longfellow’s time, and today it jars, reminding one of the Quakers, the Amish, the Bible and Shakespeare. The *du-Sie*, or *thou-you* distinction is very much alive in German, as it is in Russian, French, and many other languages. Goethe’s line 6, *Die Vögelein schweigen im Walde* consists of nine anapaests, rendered by Longfellow as *The birds are silent in the trees*. The line is one syllable too short; starts with an iamb, continues with a trochee, leaving only *in the trees* an anapaest. It lacks the over-all rhythmic drive of Goethe’s German, and omits the all-important diminutive suffix *-lein* expressible in English as *-et* or *-let* as in *baronet*, or *-ling* as

in *duckling*. Whatever led Longfellow not to use the diminutive and the anapaestic rhythm must remain unknown, but I cannot imagine that there were no alternatives. Consider the following possibilities: *The birdies are hushed in the forest*, *The birdies keep hushed in the branches*, *The birdies keep mum in the brushworks*, etc. Naturally, *trees* rhymes comfortably with *these*, and Longfellow blithely went for it, although the German says nothing about ‘these.’ The last line returns to the antiquated *thou* form, aggravating it with an equally or even more antiquated *shalt*, making the future declarative far more explicit than the German, in which the present tense is used with a completely natural *thou-du* form, turning the simple and unmarked *ruhest du auch* into a labored last line, *Thou shalt rest*.

But my purpose here is not to criticize Longfellow, whose translation despite all of its faults, has become somewhat of an American classic. Let us instead compare it to another English translation, that of Edwin Hermann Zeydel (1983):

*Over every hill
Is repose,
In the trees, you feel
Scarcely goes
The stir of a breeze
Hushed birds in the forest are nesting.
Wait, you'll be resting
Soon too like these.*

The American-born Zeydel, who published many translations from German with Princeton University Press (1983), does a great deal better than Longfellow. Line 6 in particular, *Hushed birds in the forest are nesting*, is much closer to the anapaestic rhythm of Goethe’s original, but Zeydel accomplishes this approximation of Goethe’s rhythm by changing the words: there is no ‘nesting’ involved in the original. Of course Zeydel needs the word in order to rhyme with *resting* one line below, and follows Longfellow in the use of the word *breeze* which, however, he does not press into service to rhyme with *trees*, as does Longfellow, but with *these*. All in all, I prefer Zeydel’s version to that of Longfellow, but poetry translation, as we shall be forced to admit, is ultimately a question of personal preference. There is no algorithm to lead us from any given poem in any source language to any unconditionally acceptable translation of equal aesthetic value in any of the target languages.

Goethe’s famous eight-liner has been translated into other languages as well. Permit me to show you a few of the available French translations. I start with René Lasne:

NOCTURNE DU VOYAGEUR

*Sur tous les sommets,
Le repos ;
Sur la forêt,*

à peine
 Une haleine.
 Les oiseaux font silence.
 Patience : bientôt
 Tu connaîtras toi aussi le repos.

Lasne uses a rhyme, à peine 'hardly' and haleine 'breath,' but the other translators seem to have preferred an unrhymed version.

AUTRE CHANT DU VOYAGEUR
 DANS LA NUIT

*Sur tous les sommets
 Le repos règne.
 Aux cîmes des arbres
 Tu sens à peine
 Passer un souffle;
 Les oiseaux dans les bois se taisent.
 Patience!
 Toi aussi, bientôt,
 Tu reposeras à ton tour.*

(Rober Ayrault)

CHANT DU VOYAGEUR
 DANS LA NUIT. II.

*Tout est sur les sommets
 Paisible.
 Du haut des forêts
 Ne t'arrive
 Qu'un soufflé à peine;
 Aus bois les oiseaux font silence.
 Aie patience,
 Bientôt toi-même
 Reposeras.*

(Étienne May)

May's *silence* 'silence' *patience* 'patience' brings in one rhyme. But let us look at Spanish and Italian. Rafael Cansinos Asséns handles the poem as follows:

*En todas las cumbers
 la paz reina;
 por ninguna parte
 apenas si un soplo
 de vida se otea ;
 en el bosque en calma
 ni un ave gorjea.
 Aguarde que, pronto
 cesarán tu penas.*

I will not rephrase these either into German or English, as the texts are rather clear and easy to understand. One thing is clear, however, and that is the fact that they all differ considerably both from one another and from the original. Let us look at one more romance language, Italian. This is Maria Teresa Gienalli's Italian version:

UN ALTRO

*Su tutte le vette
regna la calma,
tra le cime degli alberi
non avverti
spirare un alito;
nel bosco gli uccellini stanno silenziosi.
Aspetta un poco! Presto
Anche tu avrai riposo.*

In my native language, Hungarian, there are well over two dozen translations ranging from the superb to the very poor, but I will omit these here. I must, however, mention two striking cases of literary translation of a different sort, the kind of translation where the imagination of the translator takes flight and the text departs from the original rather drastically. The first one comes from Iceland and is the Faroese version of J.H.O. Djurhuus; the second is Mikhail Yurevich Lermontov's famous *Iz Gete*, known by most educated Russians as a great poem. First the Icelandic:

*Yvir hvörjum tindum
er ró,
af nokrum vindi
valla ljóð,
illist um völlum.
Blikurinn blundar á sundi —
burtur í blundi
berast vit öll.*

This I must retranslate into German and English for the reader to appreciate what the Faroese poet has done. In German it reads: 'Über allen Gipfeln ist Ruhe, von jedem Winde kaum ein Laut irrt um das Weite. Der Erpel Schlummert im Schwimmen — fort in Schlummer schinden all Sinne.' In English this means: 'There is quietness over each mountaintop, hardly a sound from any wind strays over the ground. The drake slumbers as it swims—we are all carried away in slumber.' Goethe's silent birdies in the trees have become a drake swimming in the Atlantic, and 'you too will rest' turns out 'we are all carried away in slumber.' One is tempted to cry, 'Foul play! Goethe has been inexcusably falsified!' But as Professor Astradur Eysteinsson, the noted comparatist of the University of Iceland, from whom I received this version, pointed out to me, a drake swimming alone in the vast ocean means more to a Faroese fisherman than any bird in a forest. And what are we to think of Lermontov's version, a Russian classic, in whose version no birds, aerial or aquatic, are mentioned at all? He calls his version 'Iz Gete,' meaning 'From Goethe,' and by giving this title he avoids the possible

criticism that his poem is no translation at all, but a rewriting of the original. It goes as follows:

ИЗ ГЕТЕ

Горные вершины
Спят во тьме ночной,
Тихие долины
Полны свежей мглой;
Не пылит дорога,
Не дрожат листья...
Подожди немного,
Отдохнёшь и ты.

Lermontov keeps to Goethe's eight-line format and uses perfect Russian rhymes throughout, but the poem reads: *'The mountain heights are asleep in the night fog; the quiet valleys are filled with light dusk. The road gives off no dust, the leaves aren't rustling... Just wait a little, you too shall rest.'* Goethe's original says nothing about 'light dusk' and 'the road gives off no dust, the leaves aren't rustling' is Lermontov's own invention. Of course the plural of Russian *лист* (*list*), *листья* (*listy*), with its syllable final accent, gives him a perfect disyllabic rhyme with the phrase *и ты* (*i ty*). *Thou* is well and alive in Russian, as it is in German and French, and so the poem with its nice rhyming structure throughout, has become one of Russian literature's favorites. Lermontov, however, mentions no birds whatever, whether silently huddled in the trees in the forest, or swimming in the Atlantic like a lonely drake.

What are we to think of such inventive free translation, translation that is more like a take-off on a well-known classic than a faithful rendering of the original? Is this to be censured and condemned as a sort of literary travesty, or can we perhaps condone it on the grounds that no literary translation can ever be one hundred percent faithful to the original anyway, and so might as well encourage free-flowing experimentations or all sorts?

As the editor of two 1,200 page volumes of Hungarian poetry in English translation, I have come to view the translation of poetry as unselfish acts of heroism, studies in futility, love's labor lost, rampant insanity, an unnecessary expenditure of time, money and energy, and yet something that is ultimately well worth the effort, provided we accept the possibility of MULTIPLE TRANSLATIONS.

I discovered soon enough that I was not alone in this view. In fact Rainer Schulte, the Editor-in-Chief of *The Translation Newsletter*, the official publication of ALTA (the American Literary Translators' Association) came to the same conclusion several years before I did.

What I would therefore like to do next is to give you six different translations of the same poem without giving you the original first. After having read the six different translations without mentioning who the translators were, I will ask if you can

reconstruct in your imaginations what the original must be like. I am choosing this particular poem over other possible ones for a rather specific reason. It was written in the year 1937 in Hungarian, a language most of you don't speak or read, and the poet who wrote it performed in it an unprecedented act of turning a tragic event of his life into a peculiarly and typically Hungarian mode of 'gallows humor' spruced up with an unprecedented amount of verbal wit. So let me tell you about the poet.

He was born in 1905 and committed suicide by throwing himself in front of a train in 1937, at age 32. He was a gentle schizophrenic, who out of desperation sought refuge in the illegal Communist Party, which however, expelled him, because he also wrote deeply felt and moving religious poetry and because he had high regard for psychoanalysis. His name was Attila József, or József Attila in Hungarian.

(I must digress briefly because the name *Attila* invariably conjures up the wrong connotations in western audiences. Many of us who have seen the motion picture 'Attila the Hun' portrayed by the rough-hewn Hollywood actor Jack Palance, think of Attila as the ultimate barbarian who threw the bones he chewed the meat off behind his back, had innumerable slaves and concubines, and generally devastated Christian Europe. As recent historical research has demonstrated, this is a false image of the Hunnish king. The historical Attila spoke Latin, Greek and Gothic in addition to his native language, which although related to Hungarian, or Magyar, is a distinct language, just as the Hungarians are not the Huns, despite the shared first syllable of their names. One historical fact about 'Attila, the Hun' stands out: when he stood with his army of Visigoths in front of Rome, Pope Leo went out to meet him and addressed him in Latin, saying: 'Attila, you have one enemy you cannot conquer.' The Hunnish barbarian answered: 'And who may that be?' Pope Leo, who must have been a superb psychologist, answered: 'Your own greed, Attila. It is greater than you and it will devour you.' The king answered: 'Not so! What do you want me to do?' The recondite pope replied: 'If you want to convince me that you are stronger than your own greed, turn back, and do not attack Rome.' 'Consider it done,' Attila replied, and ordered his armies back. He never touched Rome, which, in its decadence, he could have taken like a bird's nest. Try to imagine Pope Pius XII suggesting that Adolf Hitler turn around before taking Paris and Rome. His chances would have been nil. Attila, to make a short story short, is a common given name in Hungary and no one associates it with any barbarian act, just as the name *Henry* is not necessarily associated with England's King Henry VIII, who had the disturbing habit of having his wives beheaded and monastic libraries destroyed, all in the name of Christianity.)

Attila József was born in 1905, the time of the Russian-Japanese war. The father, who was half Romanian, abandoned the family, and the mother supported her son and two daughters as a poor washerwoman. I quote George Szirtes, a major British poet, who writes about Attila József in the London *Times Literary Supplement*

'József was born into poverty and never escaped it. He was both a Marxist and a Freudian, a combination that got him expelled from the Communist Party. His poetry, which has been acknowledged by many, including Ted Hughes, to be among the most powerful work of the century, is colloquial, virtuosic, passionate,

personal and deeply socially conscious, full of tragic energy. There have been various attempts to present him in English, all with some degree of success, by Vernon Watkins, John Wilkinson, Frederick Turner and Peter Zollman among others, but his best translator by far has been Edwin Morgan.'

(May 24, 2002, page 31)

The rest of the article details Edwin Morgan's merits as a translator. The poem I am about to read you six translations of has not been translated by Edwin Morgan, for the simple reason that Morgan does not like rhymed poetry or word play. Yet the poem I have chosen to show you is, I believe, one of Attila József's most significant accomplishments as a verbal artist. The text is from Makkai 2000. Here is translation No. 1:

FOR MY BIRTHDAY (VERSION 1)

*Today I have turned thirty-two:
Methinks there is a poem due
a meet
and neat*

*His admonition was bestowed
for 'Fatherless', my bitter ode,
with steel
and zeal*

*A joy, a modest gift with which
I pamper on this tea-room niche
myself –
myself.*

*to guard the land against my kind.
I let my lute conjure to mind
his name
and blame:*

*Yes, thirty-two years flitted by
but a monthly hundred ne'er had I
how grand
my land!*

*'I trust, Attila, you won't try
to graduate and qualify!'
he screamed
and beamed.*

*By now I might well hold a chair
not be my fountain-pen's despair
so poor
a boor...*

*If Mr. Horger leaps for joy
that teaching grammar ain't my grand employ
His bliss
's amiss —*

*It happened that in Szegeed town
from college promptly sent me down
a queer
emir.*

*to all my folk I'll teach the plumb
truth, they in no curriculum
confined
can find.*

FOR MY BIRTHDAY (VERSION 2)

*I am thirty-two and wise,
poem, be a big surprise
pretty
ditty.*

*They expelled me forth and hence
for my 'Song of Innocence'
fending
sending.*

*Gift that shall my spirit rouse
in the lonely coffee house
who? Me.
who? Me.*

*He defended Hungary
rules of the academy
name
shame.*

*Thirty-second whizzing by
ten a week? I only try
hunger me,
Hungary!*

*'Long as I am teaching here
stay clear of this hemisphere'
gloating
bloating.*

*Could have been an educator
but became a pencil nibbler
sure
poor.*

*If Professor Horger's glad
poet's grammar turns out bad
little
spittle —*

*One fine day they ousted me
from the university
fool
school.*

*mine's a school for all the people
not a high school pap and nipple
each in
teach in!*

FOR MY BIRTHDAY (VERSION 3)

*Am I thirty two? That's nice.
All I need now's a surprise
just a nick-
nack;*

*My thirty-two years flew away
without ever decent pay—
some grand
homeland!*

*Can my spirits I cheer up
with another coffee cup
by myself
myself.*

*I could have been a fancy teacher
Not some lonely pencil-chewer
oh well,
what the hell!*

*But in Szeged the varsity
dean opted to get rid of me
bad omen
old man!*

*His warning hit me tough and rude
for my 'Fatherless' attitude
His stick
our hick-*

*town saved with great alacrity.
I quote here for posterity
his word
absurd:*

*'As long as I have any clout
you won't be teaching', he ran out
huffing
puffing.*

*Should Dr. Horger gloat with glee
That teaching grammar ain't for me
spit
on his wit:*

*My words will teach the nation whole
Beyond a high school's meager role
with a bomb's
aplomb.*

FOR MY BIRTHDAY (VERSION 4)

*Now that I've kicked in thirty-two
I wrote this without much ado
a slight
delight*

*a party favor for myself
in this café beside a shelf
very
merry.*

*Like wind my thirty-two have flown
not once two hundred, nor a loan
this field
did yield.*

*A teacher I could have become
not a pen-chewer, no not some
ruddy
buddy.*

*But Szeged University
had no use for diversity:
the dean
with spleen*

*objected to my poesy
accusing me of heresy
he raved
and saved*

*the country with his dagger drawn.
My spirit conjures with a frown
his ire
and fire.*

*'As long as it is up to me
nowhere will you a teacher be!'
He huffs
and puffs.*

*If Dr. Horger jumps for joy
that grammar ain't my daily joy
his lust
goes bust:*

*I'll teach the nation as a whole
over a high school's daily role:
poet:
know it!*

FOR MY BIRTHDAY (VERSION 5)

*Upon my thirty-second year—
what a surprise, this poem here,
knicky
knacky:*

*a little gift with which I say,
lurking alone in this café:
happy
happy.*

*Thirty-two years just blew away,
I never made ten doits a day:
hungry
Hungary.*

*A pedagogue I might have been,
not this pen-pushing might-have-benn,
saddie
laddie.*

*But no; Herr College Chancellor
Showed me the outside of the door:
mocktor
Doktor.*

*It was a sharp shock for sure
my 'father' poem got its cure;
his word
and sword,*

*that saved the fatherland from me,
evoked my spirit and set free
its name
and flame.*

*'As long as I have any say
you'll not teach here a single day' —
bibble-
babble.*

*If Mr. Antal Horger's pleased
our poet's grammar-study ceased —
folly's
follies —*

*no high school, but a nation, I,
although he like not, by and by
shall teach
shall teach.*

FOR MY BIRTHDAY (VERSION 6)

*To end my thirty-second year
I wrote myself a souvenir
a prize
surprise*

*A quick impromptu memoir
saluting on this coffee-bar
my birth
on earth.*

*Thirty-two years... Without a doubt
what Hungary has doled me out
was not
a lot.*

*I could have been a teacher, but
I wear my pencils to the butt
for just
a crust,*

*for I was sent down from Szeged
by the provost, that egg-headed
old so
and so,*

*'Until I do give up the ghost
don't dream of any teaching post' —
I quote
unquote.*

*who picked on my 'With a Pure Heart'.
To save the nation from my art
he barred
the bard*

*But I don't care if I am banned
from Prof. A. Horger's graduand
grammar
crammer.*

*and drew his sword against my kind.
His words deserve to be enshrined
to shame
his name:*

*I'll teach my nation, one and all
much greater things than what you call
college
knowledge.*



The question is, can an Anglophone audience reconstruct from these six English versions of the same poem what the original must be like? The poem is generally considered 'untranslatable,' because it uses a great amount of word-play. I have been warned by a number of literati working with translations of Hungarian poetry into English not even to dare touching it. I have decided that whereas it is probably true that not any one translation can render the poem's rhythm, feel, word-play and general message, a constellation of several translations actually might.

The idea occurred to me in the summer of 1985 when, on my way to Singapore, I stopped in Greece for a fortnight and managed to get to Olympia, where I saw the magnificent statue of Hermes by Praxiteles. I joined a group of French university students, who were advised by their tour guide to take their time and walk around the statue slowly in no less than fifteen minutes trying to get a different impression from every possible angle, north, north-east, east, south-east, south, south-west, west, northwest and back to the north. I found the experience revealing and tried to apply it to poetry translation. Every translator finds something else they wish to emphasize either for the idea or the sound, or the word play.

Before I reveal the identity of the six different translators of this poem, two of whom happen to be present here tonight, I would like to read you the Hungarian original and then present you with a word-for-word, and where necessary, a morpheme-for-morpheme rendition into the kind of pidgin English non-speakers of Hungarian must be supplied with alongside indications as to where a rhyme occurs, where a pun is placed, etc.

SZÜLETÉSNAPOMRA

*Harminckét éves lettem én —
meglepetés e költemény
csecse
becse:*

Thirty-two yearish became I
surprise (is) this poem
knick
knack

*ajándék, mellyel meglepem
e kávéházi szegleten
magam
magam.*

gift (is) which-with surprise-I
this coffeehouse-ish corner-at
myself
Myself.

*Harminckét évem elszelelt
s még havi kétszáz sose telt.
Az ám,
Hazám!*

Thirty-two years-of-mine away-winded
and monthly two-hundred never got
that's right
Fatherland mine!

*Lehettem volna oktató
nem így töltőtoll koptató
szegény
legény.*

Have-been-I could teacher
not such fountain pen wearer-downer
poor
Lad.

*De nem lettem, mert Szegeden
eltanácsolt az egyetem
fura
ura.*

But not became-I, because Szeged-at
away-counselled me the university's
strange
master.

*Intelme gyorsan, nyersen ért
A „Nincsen apám” versemért,
a hont
kivont*

Admonition-his fast, raw-ly reached
the 'I have no father' poem-mine-for
the fatherland
drawn out

*szablyával óvta ellenem.
Ideidézi szellemem
Hevét
s nevét:*

saber-with defended-it(OBJ)-he(SUBJ)
against-me.
hither-conjures spirit-mine
ardor-his
and name-his:

*“Őn, amíg szóból értek én,
nem lesz tanár e féltekén” —
gagyog
s ragyog.*

'You, as-long-as word-from
understand I
not will-be teacher this hemisphere-on'
mumbles-he
and glitters-he.

Ha örül Horger Antal úr,
hogy költőnk nem nyelvtant tanul,
 sekély
 e kékj —

If rejoices Antal Horger Mr.
that poet-ours not grammar studies,
 shallow (is)
 this lust —

Én egész népemet fogom
nem középiskolás fokon
 taní-
 tani !

I entire nation-mine will
not highschoolish degree-at
 in-
 struct.



This ‘pidgin English’ version of the poem, qua text, is necessary for any foreign would-be translator, in order to be able to rationalize it in more grammatically fluent prose, as saying:

I have become thirty-two years old. This poem is a surprise, a trifling thing, with which I surprise myself in this corner of a coffee house. Thirty-two years of mine have flown by like the wind, but I have never managed to make two hundred a month, that's right, my country! I could have been an instructor, not such a wearer-down of the fountain pen, a poor lad. But I did not become one, for in Szeged the weird boss of the University gave me my walking papers (or ordered/counseled me to leave). His admonition me reached fast and furious (in a raw manner), for my poem 'I have No Father', and he defended the country against me with saber drawn. My spirit conjures his ardor and name: 'You, as long as I understand any word, will be no teacher in this hemisphere' he mutters and radiates. If Mr. Antal Horger is glad that our poet doesn't learn grammar, this lust is shallow, for I will teach my entire nation and not at the high school level.

This is the syntactically correct, hence comprehensible, meaning of this text, in prose form. The previous ‘pidgin English’ wording is there for the Anglophone reader not familiar with Hungarian to see and appreciate what the agglutinative suffixation of Hungarian does, and how it brings about the poet's unique rhyming scheme.

It is on the basis of this information that the six poets, whose translations I present above, made their individual choices of how to render the poem in English.

And now as to the identity of our six translators:

1. István Fekete, a bilingual Hungarian living in Budapest.
2. Anton A. Nyerges, a bilingual American-Hungarian who lived in South Bend, Indiana.
3. Earl M. Herrick, American linguist, who worked with a native speaker of Hungarian.
4. Myself, being a Hungarian-dominant quasi-bilingual.

5. Frederick Turner, a noted American poet, with the help of Zsuzsanna Ozsváth, a native of Hungary, both living in Texas and teaching at the University of Texas in Dallas.
6. Peter Zollman, a Ph.D. in physics, native Hungarian living in London, England.

Many people I have shown these six translations to feel that number 6, by Zollman, is the best, and that the professional American poet, Frederick Turner, although clever in parts, spoiled the punch line in the last stanza, whose very charm stems from the fact that the poet turned a single verb into two identical parts in keeping with the disyllabic lines he uses throughout. Turner repeats 'to teach, to teach' when the two syllables of Hungarian *tani-tani* are but a single verb from *tanít* 'he teaches' plus '-ni', the infinitival suffix, with the /a/ in front of it inserted for reasons of euphony only.

Much as I would like to end this presentation with a theoretical conclusion of what 20th century theories can handle translation and which ones cannot, such a study will have to wait for another occasion. Translation in all of its forms, but particularly that of poetry, is as mysterious as Language itself. Whoever understands how the human brain works in detail (as for instance Lamb 1999) tying us together in heterogeneous societies pursuing only partially predictable agenda with our 'messages' sometimes overt, sometimes covert, mixed up with each individual speaker's emotional states as has been best attempted to date in Halliday 1975, will in all probability also be able to develop the most realistic theory of translation.

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CONSONANT STRENGTH INNOVATIONS ACROSS THE SPANISH-
SPEAKING WORLD: EVIDENCE AND IMPLICATIONS FOR
A USAGE-BASED MODEL OF PHONOLOGY

TIMOTHY L. FACE
University of Minnesota

WORK IN SPANISH PHONOLOGY generally deals either with data consistent throughout a majority of the Spanish-speaking world or with the phonological innovations found in a particular regional variety. Both of these approaches are essential. Work on data that is consistent throughout much of the Spanish-speaking world allows us to come to an understanding of the most important phonological processes found in Spanish. And work on the innovative characteristics of a particular regional variety allows us to come to a more complete understanding of that variety and how it is different from other varieties of Spanish. In the present study I take a third approach that has generally not been taken. I examine at once many phonological innovations across varieties of Spanish and consider what a panoramic view of this breadth can tell us about Spanish phonology.

The greatest phonological differences between varieties of Spanish, and certainly those that are most widely associated with particular varieties of Spanish, are differences in the consonant system. Some of the more well known differences are the existence of /θ/ in Castilian Spanish, the aspiration of /s/ to [h] in Caribbean Spanish, and the production of /j/ as either [ɟ] or [ʃ] in Argentine Spanish. But there are many other differences in consonant systems as well. In this paper I consider specifically consonant strength innovations across the Spanish-speaking world, where a consonant is produced either as a stronger or a weaker consonant in one or more varieties of Spanish than in most varieties. The variety of consonant strength innovations that exist across the Spanish-speaking world is great. But the panoramic view of these data that will be taken throughout this paper provides the opportunity to examine the largely uninvestigated commonalities in consonant strength innovations across varieties. This, in turn, will lead to a better understanding of the ways in which the Spanish language is changing and why. Based on these findings, I will consider the implications for phonological theory.

In the following section I present the consonant strength innovations that will serve as the basis for the discussion that follows. Section 2 contains a discussion of the innovations and the commonalities found across varieties of Spanish. In Section 3 I consider the evidence and implications of the data for phonological theory. Finally, Section 4 presents the conclusions that can be drawn from the present study.

1. CONSONANT STRENGTH INNOVATIONS. The innovations presented in this section are different from data presented in most phonology papers, in that they come from

many varieties of Spanish yet are intended to be considered together in order to see some general patterns across Spanish in consonant strength innovations that cannot be seen clearly within any one variety of Spanish. Many of the consonant strength innovations discussed here occur in multiple varieties of Spanish. For this reason, an example regional variety is given for each, but this is by no means intended to indicate that this is the only variety of Spanish to have this innovation. In some cases the innovative form alternates with the form that is most common across varieties of Spanish, indicating a possible change in progress. As such alternations are not the topic of the present study, these cases are not noted here. Many of the innovations considered herein come from multiple sources, and so only one primary source is given.

It is pertinent to clarify one issue here. In discussing consonant strength innovations, there is necessarily reference to a consonant being stronger or weaker than in other varieties of Spanish. This is to be taken as a phonetic comparison only and not as a theoretical claim that a particular variety of Spanish has a process which takes some underlying consonant and either strengthens or weakens it (as in generative phonology). In fact, as will be discussed in Section 3, there is evidence against such a generative view of phonology.

In order to divide the list of consonant strength innovations into manageable chunks, they are presented here in groups by sound categories and groupings natural to Spanish. The innovations in (1) deal with /b, d, g/. Across Spanish the most common pattern is for voiced stops to occur after a pause, after a nasal, and after /l/ in the case of /d/. In other positions /b, d, g/ are realized as voiced approximants.

(1) **Consonant strength innovations affecting /b, d, g/**

Stronger than in other varieties:

- Stops (i.e. [b, d, g]) after consonants (e.g. El Salvador – Lipski 1994)
- Stops after semivowels (e.g. Honduras – Lipski 1994)
- Stops between vowels (e.g. Yucatan, Mexico – Lipski 1994)

Weaker than in other varieties:

- Approximants (i.e. [β, ð, ɣ]) after nasals (e.g. Castilian Spanish – Aguilar et al. 1993)
- Approximants phrase-initially (e.g. Miami Spanish – Hammond 1976)
- Elision between vowels (e.g. Bolivia – Lipski 1994)
- Elision of /d/ phrase-finally (e.g. Panama – Lipski 1994)

The innovations in (2) deal with /p, t, k/. In most varieties of Spanish these consonants have only one realization, as a released, but unaspirated, stop (i.e. [p, t, k]).

(2) **Consonant strength innovations affecting /p, t, k/**

Stronger than in other varieties:

- Aspirated stops (i.e. [p^h, t^h, k^h]) (e.g. Colombia – Lipski 1994)

Weaker than in other varieties:

- Voiced stops between vowels (e.g. Cuba – Lipski 1994)
- Voiced stops or approximants between vowels (e.g. Northern Spain – Lewis 2001)

In (3) are the innovations dealing with /tʃ/, which is most commonly produced as a voiceless alveo-palatal affricate in Spanish.

(3) Consonant strength innovations affecting /tʃ/

Weaker than in other varieties

- Fricative (i.e. [ʃ]) (e.g. Misiones, Argentina – Lipski 1994)
- Voiced affricate (i.e. [dʒ]) (e.g. Castilian Spanish – Aguilar et al. 1993)

The consonant strength innovations for /j/ (often transcribed as /y/ in work on Spanish) are given in (4). There is much variety across the Spanish-speaking world, but the most common pattern is a palatal fricative pronunciation, of varying degree of frication, similar to [j], but sometimes approaching a palatal affricate [tʃ].

(4) Consonant strength innovations affecting /j/

Stronger than in other varieties

- Voiceless alveo-palatal fricative (i.e. [ʃ]) (e.g. Argentina – Lipski 1994)
- Voiced or voiceless alveo-palatal affricate (i.e. [dʒ] or [tʃ]) (e.g. Paraguay – Lipski 1994)
- Affricate phrase-initially (e.g. Cuba – Lipski 1994)
- Affricate word-initially (e.g. Puerto Rico – Lipski 1994)

Weaker than in other varieties

- Elision in contact with [i] or [e] (e.g. Guatemala – Lipski 1994)

Consonant strength innovations affecting the fricatives /s, f, θ, x/ are given in (5). Only Castilian Spanish has /θ/. The other three consonants are most commonly pronounced [s, f, x] across varieties of Spanish.

(5) Consonant strength innovations affecting /s, f, θ, x/

Weaker than in other varieties

- Loss of energy and voicing between vowels (e.g. Castilian Spanish – Aguilar et al. 1993)
- Aspiration of /x/ (e.g. Cuba – Lipski 1994)
- Loss of /x/ (e.g. Colombia – Lipski 1994)
- Aspiration or loss of /s/ (e.g. Caribbean Spanish – Kaisse 1999)

While the majority of consonant strength innovations in Spanish affect obstruents, there are some innovations which affect sonorants as well. These are shown in (6)

and (7). The innovations in (6) are those that affect the two Spanish rhotics, /r, ɾ/. While /ɾ/ is generally produced as an alveolar tap [ɾ] in nearly all varieties of Spanish, there is a lot of variation in the pronunciation of /r/. Prescriptively, this sound is to be produced as an alveolar trill [r], but several recent studies (e.g. Hammond 1999, 2000) have shown that this sound is not produced with a high degree of frequency. Rather there is a plethora of possibilities, including a variety of fricative pronunciations. Since these two sounds only contrast between vowels, there is not a tremendous necessity of maintaining a contrast, which is probably why /r/ has so widely lost its characteristic trill pronunciation.

(6) Consonant strength innovations affecting /r, ɾ/

Stronger than in other varieties

- Devoicing of /r/ (e.g. Dominican Republic – Lipski 1994)

Weaker than in other varieties

- Tap production of /r/ (e.g. Castilian Spanish – Aguilar et al. 1993)
- Approximant between vowels (e.g. Castilian Spanish – Aguilar et al. 1993)
- Retroflex glide (e.g. Nicaragua – Lipski 1994)
- Phrase-final elision (e.g. Ecuador – Lipski 1994)
- Word-final elision (e.g. Chile – Lipski 1994)

Nasals in Spanish are largely unaffected by consonant strength innovations. In (7) only elision is shown to affect nasals.

(7) Consonant strength innovations affecting /m, n, ɲ/

Weaker than in other varieties

- Word-final elision (e.g. Bolivia – Lipski 1994)

2. DISCUSSION OF CONSONANT STRENGTH INNOVATIONS. The consonant strength innovations shown in the previous section are numerous and come from numerous varieties of Spanish. Yet there are generalizations that can be made about these innovations across the Spanish-speaking world, especially as concern the motivations for such innovations. As shown in the previous section, there are innovations in which a consonant is stronger than in other varieties of Spanish and others in which a consonant is weaker than in other varieties. In this section I will discuss the phonetic and phonological motivations for these innovations. I begin with innovations in which a consonant is weaker than in other varieties of Spanish, and then discuss those cases where a consonant is stronger than in other varieties.

2.1. INNOVATIVELY WEAK CONSONANTS. There are both phonetic and phonological motivations for innovatively weak consonants in Spanish. I begin with the phonetic motivations. There are two types of phonetic motivations that can be found for

innovatively weak consonants. The first is a simplification of the articulation of the consonant. By this I refer to cases where the phonetic context does not play a role, but rather the articulatory effort is reduced regardless of phonetic context. Examples of this type of innovation are the production of /tʃ/ as a fricative, the production of /r/ as a tap or fricative, and the aspiration or elision of /x/. In the case of /tʃ/, the affricate that is the most common pronunciation across varieties of Spanish is a complex articulation in that it requires a stop burst followed by frication. By eliminating the stop burst and producing only the frication, the result is still a strong consonantal sound, but one which is articulatorily less complex. The case of /r/ is different, in that an alveolar trill is not complex, involving a sequence of gestures for its production. Nonetheless, it requires much articulatory effort and is one of the more difficult sounds to produce. So here the production of a tap or fricative is also a case of articulatory simplification. The case of /x/ is one where there is a span of degrees of frication across varieties of Spanish. In those varieties with less frication, there can be a change to aspiration [h] since this sound is essentially [x] without the velar frication, which was not prominent in these varieties to begin with. Therefore the articulation becomes simpler since the dorsum of the tongue does not need to articulate a velar constriction. While the details are different, each of these examples shows how the innovation of a weaker consonant can be motivated by a simplification of the articulatory gestures.

The second type of phonetic motivation for innovatively weak consonants is a motivation by the phonetic environment. Phonetic environment plays a large role in sound systems, and is the motivation of many phonological changes (e.g. assimilations). Some examples of innovatively weak consonants in Spanish motivated by phonetic environment are the voicing of /p, t, k, tʃ/ between vowels, /p, t, k/ having voiced approximant realizations between vowels, the elision of /b, d, g/ between vowels, and the elision of /j/ in contact with [i, e]. In three of the four examples just given, the innovatively weak consonant occurs between vowels. In these cases there are different types of assimilations to the vowels. Typically we have a strong consonantal articulation, but the fact that the sound is surrounded by vowels motivates easing the articulation of the sequence of VCV by making the C more similar to the two surrounding Vs. Thus typically voiceless /p, t, k, tʃ/ receive a voiced articulation, meaning that the vocal folds vibrate through the entire VCV sequence rather than stopping and then starting again. When /p, t, k/ have voiced approximant realizations between vowels, this goes a step beyond voicing assimilation to the vowels, and makes the articulation even more vowel-like, in that there is less of a constriction within the oral cavity. The elision of /b, d, g/ between vowels takes this to the extreme, as the consonantal constriction is totally eliminated and therefore the articulation becomes totally vocalic, with no need to produce any element of a consonantal articulation. The elision of /j/ in contact with [i, e] is a more specialized case of this type of weakening, as the palatal articulation of /j/ is so similar to the articulation of the front vowels (see Hume 1994 for discussion) that it is not a prominent consonant in this environment. Therefore the phonetic similarity leads to the loss of the consonant, which is less than prominent in this phonetic environment.

While these two types of phonetic motivations explain many innovatively weak consonants in Spanish, they do not explain all of them. There are some innovatively weak consonants which have a phonological motivation. As is the case with phonetic motivations, there are two types of phonological motivations for innovatively weak consonants in Spanish. The first type is analogy. In cases of this type, a consonant is realized weaker than in most varieties of Spanish because the consonant is influenced by the weaker version of the consonant existing in other cases (e.g. as a result of a conditioning by phonetic environment). There is a clear example in the cases of an approximant realization of /b, d, g/ after a nasal or phrase-initially. In most varieties of Spanish these consonants are produced as stops in these environments. But approximant versions of these consonants exist due to the conditioning of certain phonetic environments. For example, in almost all varieties of Spanish, /b, d, g/ have approximant realizations between vowels, which is a very common position for these consonants. Since they are so often approximants, other uses of these consonants are realized as approximants through analogy. In this sense, the occurrences of /b, d, g/ after nasals and at the beginning of phrases analogize to become more like the occurrences of /b, d, g/ between vowels.

The second type of phonological motivation for innovatively weak consonants in Spanish is the achievement of an idealized phonological structure. It is a well-known characteristic of Spanish that it has a preference for CV syllables. While Spanish permits other types of syllables, the 'ideal' syllable in Spanish starts with a consonant and ends with a vowel. Some innovatively weak consonants in Spanish are the result of approaching this ideal syllable structure. One example is the aspiration of /s/, which commonly occurs in the coda of a syllable in many varieties of Spanish. When /s/ is produced as aspiration [h], there is no oral constriction. In this sense, the consonant becomes more vocalic. In fact, acoustically, [h] is nothing more than a voiceless version of the vowel to which it is adjacent. Since this occurs when /s/ is in a syllable coda, the syllable comes closer to the idealized CV syllable by losing much of the consonantal quality of the /s/. In some varieties, the next step after aspiration is elision of /s/, and in these cases there truly is the achievement of the ideal CV syllable. Since an /s/ in the onset of a syllable should maintain its consonantal qualities, as the ideal syllable begins with a consonant, aspiration does not occur in this environment.

The question then arises as to how to explain the elision of word-final /d, r, n/ mentioned in the previous section. These elisions lead to the ideal CV syllable, but only at the end of the word. In fact, in Paraguayan Spanish most word-final consonants are elided at the vernacular level (Lipski 1994). These consonants do not elide in the coda of every syllable. Therefore, it must be recognized that other units of phonological structure besides the syllable can affect consonant strength. These include both the word and the phrase. It would make perfect sense for the idealized structure to be realized in the largest unit of structure and then spread, by analogy, to others. For example, on the Caribbean coast of Colombia phrase-final /r/ is often elided. In Chile, word-final /r/ (which includes phrase-final /r/) is often elided. It can be said that Chilean Spanish has progressed further than Caribbean Colombian Spanish in

the elision of /r/. This is especially plausible since all varieties of Spanish with word-final elision within a phrase also have phrase-final elision. It is certainly possible, then, that all cases of word-final /r/ in Caribbean Colombian Spanish will eventually be elided due to analogy with phrase-final /r/, since phrase-final position is one particular case of word-final position.

2.2. INNOVATIVELY STRONG CONSONANTS. The motivation for innovatively strong consonants in Spanish is always phonological. There are no cases of phonetically motivated strengthening of consonants. As in the case of innovatively weak consonants, there are two types of phonological motivation for innovatively strong consonants in Spanish: analogy and the achievement of an idealized phonological structure. Analogy works exactly the same way in creating innovatively strong consonants as it does in creating innovatively weak consonants. When a consonant has two realizations, one stronger than the other, either the stronger or the weaker may change under the influence of the other. The stop productions of /b, d, g/ between vowels or after non-nasal consonants in some varieties of Spanish provide an example. While in these environments most varieties of Spanish have approximant productions of these consonants, there are stop productions in other environments. The stop productions in other environments may influence the production of /b, d, g/ between vowels or after non-nasal consonants, resulting in the use of a stop in these environments as well. Since most varieties of Spanish have both stop and approximant productions of /b, d, g/, either the stops or the approximants could change under the force of analogy. And this is precisely what is found. In some varieties of Spanish (e.g. Yucatan, Mexico; Honduras; El Salvador) stops are created by analogy in positions where most varieties employ approximants. In other varieties (e.g. Castilian Spanish, Miami-Cuban Spanish) approximants are created where in most varieties stops are generally found.

The achievement of an idealized phonological structure can result in innovatively strong consonants, just as it can result in innovatively weak consonants. The difference is that while innovatively weak consonants are created at the right edge of a unit of phonological structure (e.g. syllable, word, phrase), innovatively strong consonants are created at the left edge of a unit. Taking the syllable as a first example, the ideal of the CV syllable may result in strengthening an onset consonant to make it even more consonantal (i.e. further from being vocalic). Two examples are the affricate production of /j/ and the aspirated stop productions of /p, t, k/. While most varieties of Spanish have a fricative production of /j/, the appearance of this fricative in a syllable onset may lead to its strengthening to an affricate in order that its production have more of a constriction, making it more consonantal and less vocalic. Note that this can happen at the left edge of different sized phonological units, as shown in Section 1: the phrase (e.g. Cuba), the word (e.g. Puerto Rico), or the syllable (e.g. Paraguay). It is certainly possible that analogy will result in Cuban and Puerto Rican Spanish spreading the affrication of /j/ to all syllable onsets rather than just phrase and word onsets, respectively. The other example is the aspirated stop production of /p, t, k/. These consonants almost exclusively appear in syllable onsets in Spanish. While they

are already strong consonants in that they are generally produced as voiceless stops (though there is phonetically motivated weakening in some cases, as discussed in Section 2.1), aspiration strengthens them even more by lengthening the voice onset time following the stop burst. So even a strong consonant can be strengthened at the left edge of a unit of phonological structure. This has been shown in recent studies on other languages as well (e.g. Fougeron and Keating 1997). It is also worth noting that not only are existing consonants sometimes strengthened in Spanish as a result of the pursuit of an idealized phonological structure, but in some varieties of Spanish consonants are epenthesized for this purpose. In Northeast Argentina and in Paraguay a glottal stop [ʔ] is often epenthesized before a word-initial vowel, and sometimes even within a word to break up vowels in hiatus. In Guatemala [ɰ] is epenthesized to break up vowels in hiatus. In these cases the result is the achievement of (part of) the idealized phonological structure, since the unit of phonological structure (i.e. the word or syllable in these cases) begins with a consonant.

3. EVIDENCE AND IMPLICATIONS FOR USAGE-BASED PHONOLOGY. In Section 2 four motivations for consonant strength innovations in Spanish were discussed: articulatory simplicity, phonetic environment, analogy, and achievement of an idealized phonological structure. It is important to note, however, that these motivations become apparent only when consonant strength innovations are considered across varieties of Spanish. An individual variety will not have enough of the innovations mentioned in Section 1 to make evident these four motivating factors. So while studies of the phonology of individual varieties of Spanish are certainly important, there are certain issues that are best seen when the entire Spanish-speaking world is considered at once. The issue to be addressed in this section is what the motivations for Spanish consonant strength innovations discussed in Section 2 tell us about phonology.

Looking at consonant strength innovations in the Spanish-speaking world as I have done in this paper raises a question for phonological theory: how can we account for consonant strength innovations in a particular variety of Spanish if understanding the innovations requires looking at a panoramic view of the entire Spanish-speaking world? Certainly it is possible to write a generative phonological rule to express a sound change. And within constraint-based generative approaches, such as Optimality Theory, a re-ranking of constraints can account for a particular change. However, the phonological rule stipulates a change and has nothing to say about the motivation for such a change. And while a re-ranking of constraints partially explains the motivation for a change, it does not go far enough. The change is motivated by an increase in the importance assigned to a particular constraint in the grammar. But this is both a theory-internal explanation and one that is specific to the variety being considered. What a re-ranking of constraints does not achieve is a data-based explanation for the change. So the question that must be addressed is this: how can phonological theory incorporate the panoramic view of Spanish into an analysis of consonant strength innovations and do so in a way that is truly explanatory, based on language data? This can be accomplished, I propose, through usage-based phonology.

Usage-based models of phonology and morphology have existed in various forms for a number of years, but Bybee's (2001) model has brought such models more widespread recognition. In usage-based phonology, whole words, or even small phrases, that are heard in one's language experience are stored in the lexicon. There are connections in the lexicon between stored items or parts of stored items based on phonological similarity, semantic similarity, etc. The connections may show variation, such as between the voicing quality of the plural definite article *los* based on the following sound (e.g. *lo[s]* *pulmones* 'the lungs', *lo[z]* *brazos* 'the arms'). Language experience builds the lexicon and is the basis for language production. Therefore, in Bybee's model, when the plural definite article *los* is to be used in speech production, the lexicon will be consulted and the voicing of the final consonant will be determined by language experience. Since the final consonant is voiced when followed by a voiced consonant and voiceless in all other contexts, this will likely be the pattern used in production. However, over time there is certainly the possibility that analogical leveling will take place and that either the voiceless or the voiced version of this consonant will expand its usage. In usage-based phonology, the fact that both versions of the consonant exist in the lexicon means that there is a clear explanation for analogy. The same is true in the cases of analogy leading to consonant strength innovation presented above. Since non-contrasting consonants with nearly the same characteristics, such as [b, β], are both stored in the lexicon, there is a natural explanation for an analogical change, in this case of either the stop to the approximant or vice versa. And, as I have pointed out above, both of these analogies occur in different varieties of Spanish.

But how can the non-analogically motivated consonant strength innovations be explained within usage-based phonology? The two phonetic motivations for consonant strength innovations (i.e. articulatory simplicity and phonetic environment) pose no problem for usage-based phonology. If, in order to simplify articulation, a sound is produced differently than it has previously been produced, this new token of use will be stored in the lexicon with the other previous tokens of the same unit of storage (i.e. word or short phrase). This leads to variation in the lexicon, and phonetic simplicity will likely lead to the newer form being used more often, strengthening its representation in the lexicon until it is the dominant form and a full-scale sound change takes place. Since in usage-based phonology the lexicon consists of tokens of language use, it contains phonetic detail, and therefore a phonetically-motivated sound change is simply a part of phonology and is not compartmentalized as separate from phonology.

So far I have explained how usage-based phonology can account for consonant strength innovations that result from phonetic motivations and for those that are the result of analogy. The last motivation for consonant strength innovations discussed in this paper is the achievement of an idealized phonological structure. Particularly, I have shown that there is a move toward a CV syllable, with onset consonants becoming stronger and coda consonants becoming weaker. Bybee (2001) argues that the move toward a CV syllable is nothing more than the result of the weakening, and sometimes ultimate deletion, of coda consonants. A CV syllable is a result only,

and not a motivating factor. I believe that this portion of Bybee's model of usage-based phonology must be revised. She assumes that the articulation of coda consonants involves 'gestures of lesser magnitude or duration than those found in syllable-initial consonants' (Bybee 2001: 195-96). While it may be true that gestures of lesser magnitude are found for coda consonants, this explains only why coda consonants should be susceptible to weakening but has nothing to say about strengthening of onset consonants or epenthesis of new onset consonants to break up vowels in hiatus. The fact that consonants strengthen or are introduced in onset position must also be explained as part of the change toward a CV syllable. Bybee (2001) claims that phonological structure is emergent. It has no status other than being the result of phonetic tendencies. I propose that as speakers recognize the emergence of phonological structure, it is then at their disposal to be used as part of the phonological system. As speakers become aware of the tendency in their language to create CV syllables, they can then use this phonological information to initiate sound changes. This would include not only the weakening of coda consonants, but also the strengthening of onset consonants and the epenthesis of new onset consonants. In this connection, see especially Lamb (1999).

4. CONCLUSION. Throughout this paper I have discussed consonant strength innovations in Spanish and have shown that there are various motivations, both phonetic and phonological, for them. However, it is not until a panoramic view of consonant strength innovations across Spanish is taken that these motivations can be seen. Any one variety of Spanish has too few of these innovations in order for one to see a pattern. But when the Spanish-speaking world is considered as a whole, it becomes evident that the consonant strength innovations form a pattern and that there are four clear motivations for them. It is important to note that taking such a panoramic view of an entire language can produce linguistic explanations not visible when one looks only at one particular variety. This approach to phonology is not generally taken, but it must be pursued in other investigations in order to see what else such an approach can reveal about phonology.

I have also argued that the consonant strength innovations discussed in this paper are not adequately accounted for by either rule-based or constraint-based models of generative phonology, but that a usage-based model of phonology does provide an adequate account. The innovations resulting from phonetic simplification and analogy fit neatly into Bybee's (2001) model of usage-based phonology. Those that result from the pursuit of an idealized phonological structure do not fit into the model as proposed by Bybee as phonological structure in her model has no status, but is simply emergent from patterns of language use. I propose, however, that speakers can recognize and make use of this emergent structure in their speech production, and therefore this structure can play an active role in phonology and motivate a sound change, such as the consonant strength innovations discussed here. This is consistent with Lamb's (1999) approach.

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HOW CALL CAN HELP LANGUAGE REVITALISATION: THE CASE OF NAWAT

MONICA WARD
Dublin City University

THE MAJORITY of the world's 6000+ languages will have disappeared within the next 100 years (Hale 1992). The factors that contribute to the decline of a language (e.g. language suppression and low social prestige) also hamper maintenance and revitalisation efforts. Linguists like to study and document languages, but at the same time, they have become increasingly aware of and interested in the preservation and maintenance of Endangered Languages (ELs). EL communities may not have the time or the resources to worry about the decline of their language, but if they do want to preserve and revitalise their language, they would like linguists to help them in their efforts. Linguists may feel that they lack the necessary skill to develop language pedagogical materials. This paper shows that the development of Computer Assisted Language Learning (CALL) materials can contribute to language maintenance and revitalisation efforts. It outlines how the use of a software and syllabus template and syllabus can be used to develop CALL materials. A case study of the development of CALL materials for Nawat (or Pipil), an EL of El Salvador, highlights the potential for CALL materials to assist and foster language preservation efforts. The positive reception of the materials provides encouraging signs for the integration of CALL and EL applications and the involvement of linguists in the process.

1. BACKGROUND. There are over 6000 languages in the world (Grimes 2000), although the exact number is unknown. It is reckoned that within 100 years, 90% of these languages will have disappeared (Krauss 1992). Languages are disappearing in all parts of the world, including the Americas. There are many reasons why a language ceases to be used including lack of prestige (compared to a more prestigious, dominant language), lack of social uses, language suppression, linguisticism and linguistic genocide (Skutnabb-Kangas 2000).

1.1. ENDANGERED LANGUAGES. The United Nations identifies 7 different levels of endangerment (UNESCO 1993), ranging from 'not endangered language' to 'extinct'. Terralingua (2002) classifies languages as either safe, endangered or moribund (no longer learned by children) and Fishman (1991) has 8 stages of EL status, ranging from stage 1 (some usage by higher levels of government) to stage 8 (only a few elderly speakers). Regardless of which classification is used, languages that fall outside the safe category can be considered to be at risk. Language preservation is a difficult task, especially once a language has started to decline. Language revitalisation is even more difficult than language preservation. There are very few languages that have

successfully been revived. Examples include Cree, Hualapai, Maori and Hawaiian (Stiles 1997).

One important factor in preservation and revitalisation efforts is the availability of written materials in the language (other important factors, including political and social ones are outside the scope of this paper—see Reyhner 1999 for more information). While the non-linguistic factors are outside the control of linguists, language documentation efforts and assisting the production of materials in threatened languages are areas in which linguists can contribute to conservation efforts.

1.2. LINGUISTS AND EL COMMUNITIES. Traditionally, linguists like to study and document languages. They are interested in the structure of a language or languages. They seek to identify interesting features of a language that may not exist in other languages. Alternatively, they may wish to investigate whether or not a particular linguistic theory holds for certain languages. Since the late 19th century, linguists (e.g. Sapir) have been interested in language preservation and maintenance. Hale's seminal article (Hale 1992) spurred many linguists to document ELs before they disappeared, and this has contributed to a rekindling of linguistic interest in ELs.

People who live in a community that speaks an EL often live in very difficult socio-economic circumstances. Many live in such poor economic circumstances that most of their energy goes into struggling to survive. Many such communities are in rural areas, with little access to basics such as clean water and sanitation. Formal education may not be widely available and literacy levels (in either the dominant language or the EL) may be quite low.

Given this background and the low prestige often associated with ELs, it is not surprising that language related matters are not considered high priority items for a community. If a community *is* interested in language matters, the interest usually centres on language maintenance and revitalisation, rather than on pure documentation. The community would like to develop teaching materials, especially for the children. They would like linguists, who have the benefit of formal education and knowledge of languages, to help them develop these materials. They would prefer that linguists work on such materials, rather than on what are perceived as formal, abstract linguistic issues.

Linguists, however willing they may be to help out in these situations, naturally may not feel comfortable working in an area outside their area of expertise (Parks 1999). There are many pedagogical issues to consider in the development of successful language teaching materials, including how to present the information in a way that is intelligible and pedagogically useful to a non-linguist, what methods are suitable for children, and how to explain features that may not be fully understood.

2. CALL AND ELs. EL communities throughout the world are running out of time. They cannot afford to wait until ideal language learning materials are available for their language. For example, the remaining speakers may have passed away by the time the materials are ready, especially for languages at stage 8 of the Fishman (1991)

classification. Likewise, linguists interested in helping EL communities may not have the time to become completely proficient in all the pedagogical issues involved in the production of language learning materials. One interesting practical solution to this problem is the use of Computer Assisted Language Learning (CALL) in the EL context, particularly if use is made of an already existing CALL template. CALL can provide the language learning materials required by an EL community (and thus contribute to language preservation and revitalisation efforts), while at the same time documenting linguistic material of interest to linguists. Using an already existing CALL template means that the EL community and the linguist do not have to start the whole process from scratch.

2.1. CALL. CALL materials can range from a simple tool (e.g. a spell checker) to a tutor (e.g. a program that aims to fill the role of a human teacher (Levy 1997)). CALL is a multi-disciplinary field that draws on the fields of pedagogy, linguistics and technology amongst others. Given this multi-disciplinarity, it is not surprising that the development of CALL materials is non-trivial. For example, the CALL Methodological Framework described by Hubbard (1996) consists of three components (Development, Evaluation and Implementation) which in turn have many sub-components. There are extra difficulties that arise in the CALL/EL context. These include limited financial and technical resources, time constraints, lack of potential informants, writing system issues, and social constraints (Ward 2002). Despite this difficulty, CALL can provide language learning materials of interest to the EL community and these materials can also be of interest to linguists in the form of online documentation and audio materials.

The development of language learning materials implies that the language must be documented, although the format may be different from that used in formal linguistics. It also often implies that a writing system must be used for the language. This can often be problematic, as there may be no writing system or several. The selection of a writing system can be a delicate issue, that may include political, logistical as well as linguistic issues. Further treatment of this topic is outside the scope of this paper—see Ong (1982) and Finnegan (1988) for more details. Grammatical information may be simplified and non-linguist terms may be used to make the materials more comprehensible to a layperson. This can be especially challenging for a linguist with many years of formal training in linguistics, as the tendency to use linguistic terms is powerful. On the other hand, care must be taken not to oversimplify the information.

One useful feature of CALL is the availability of online audio files that can be listened to repeatedly and can best convey to the learner (and the linguist) how the language is actually spoken. For example, Yellow Bird (1999), a native speaker of Arikara, states that the use of multimedia computer technology is perceived as the best way for preserving speech for future learners. Audio files may consist of conversations, songs and stories. The main purpose of the files is pedagogical and therefore each file should come with a transcription and possibly a translation also. This information should be useful to learners and linguists alike.

The development of CALL materials for an EL implies that the language elicitation process is premeditated rather than natural. What each speaker is going to say is carefully planned to demonstrate some particular linguistic feature in accordance with pedagogical goals. However, it has the advantage, in that more information can be obtained quicker than by more naturalistic methods, the information is structured, (hopefully) correctly transcribed and glossed, and is grammatically correct (from the speaker's point of view).

2.2. ACCESS ISSUES. The issue of access to language materials is a sensitive one for many EL communities. It must be noted that not all EL communities are comfortable with outsiders having access to or learning their language. For example, some Native Americans do not want outsiders to learn their language. Some aboriginal communities in Australia would like recordings and images of someone who has passed away to be destroyed. This paper focuses primarily on EL communities where such issues do not arise, while at the same time highlighting the fact that access to language materials is something that should be decided with the community in question. Modern security techniques can be used to control access to sensitive materials and Iannella (2001) outlines models for managing digital rights.

2.3. CALL AND LANGUAGE MAINTENANCE AND REVITALISATION. Language maintenance and revitalisation is difficult and there is no blueprint for success. Different factors contributed to the success of Hebrew, Welsh and Maori in turn. Anonby (1999) highlights five characteristics of successful language revitalisation efforts: solidarity, literacy, immersion, the use of mass-media and sufficient population. A community's desire to preserve the language is vitally important. If the language is perceived as being socially inferior, it may be difficult for the community to fight for the language, especially if it is perceived as being old-fashioned, only a language for the old people and not 'part of the modern age'.

CALL can contribute to counteracting some of these negative perceptions. For example, CALL by its very nature puts the language on the computer, proving that it can exist in the modern age. Seeing the language online may help dispel the idea that 'it's only for the old folks'. It can help raise the profile of the language both within and outside the EL community.

Even if an EL community is not currently interested in the preservation of its language, CALL at least provides a mechanism whereby the language can be preserved for future generations that may have an interest in learning and revitalising the language. For example, in the United States, heritage language learning is popular among learners whose ancestors came from a different country or spoke a different language (Morahg 1996). Their ancestors may have consciously tried to forget their mother tongue in order to integrate better in the wider community, but now their children wish to learn the language (for cultural and perhaps other reasons). While Valiquette (1998) is critical of 'technofixes' for ELs, he acknowledges that they can have a role in the long-range preservation of a language. In this context, is it especially important

that care is taken to store data in a format that avoids obsolescence where possible (Bird & Simons 2002).

While different strategies work for different languages, language nests and Language Apprentice methods are two strategies that have been successful for preserving ELS. Language nests are where pre-school children are cared for by elderly speakers of the language (e.g. the Maori Te Kohanga Reo (Kohanga 2002)). Language Apprentice methods are where fluent elders link up on a one-to-one basis with young adults who want to learn the language (Hinton 1994). Reyhner (1999, adapted from Fishman 1991) outlines different interventions, depending on the strength of a language on the Fishman scale. In the stage 8 situation, where the Language Apprentice method may not be an option due to the health of the limited number of remaining speakers, Kushner (1999) suggests that CALL offers a creative alternative for teaching and preserving a language.

3. CASE STUDY. This section outlines a software template that has been developed for CALL materials for ELS. It presents courseware that has been produced for the Nawat (or Pipil) language of El Salvador (Ward 2001).

3.1. SOFTWARE TEMPLATE FOR CALL FOR ELS. A reusable software template and syllabus has been developed to enable the production of CALL materials for ELS. The template uses XML technologies (XML 1999, 2000) which permit the development of flexible, reusable CALL materials. The materials produced adhere to good CALL principles. Attention has been paid to the design of the user interface to ensure that it is easy to understand and consistent. This is especially important in an EL context, where familiarity with computers cannot be assumed. Furthermore, any unnecessary cognitive load associated with learning how to use the CALL materials should be minimised. The template is multi-modal and language learning materials can be produced online (for those who may not have a computer but who have access to an Internet café), on CD (for those that have a computer) and in printed format (for those without computer access). It is important to note that the same source is used to produce the materials, regardless of modality. The template syllabus aims to teach language for basic communicative functions. Each lesson focuses on a different learning theme and concentrates on the realities of the EL situation (e.g. there is no section on how to write a job application).

The template is language independent, i.e. it is not designed for one specific language. XML technologies, which are Unicode enabled, are the backbone of the template, so in theory, any language that uses characters encoded in Unicode can use the template to produce CALL materials. The aim of the template was to provide EL communities and linguists with a tool with which they could develop CALL materials without having to start from scratch. Given the generic nature of the template, CALL materials developed for a specific language using specific technology and with in-house CALL expertise will probably be superior to materials produced by the template. For example, the CALL materials developed for Arikara (Kushner 1999),

address specific requirements of the language, especially the linguistic structures that are complex and unique to the language (Ditmar 1999). Auld (2002) describes CALL materials developed specifically for the Ndjébbana language of the Kunibídjí community in Australia. The template aims to address the situation where access to such technology and CALL expertise is unavailable, such as the situation referred to by Parks (1999).

3.2. NAWAT COURSEWARE. The template has been used to produce CALL materials for Nawat (or Pipil (Campbell, 1985)), an EL of El Salvador. Grimes (2000) reports that there are approximately 20 speakers of Nawat. On the basis of field visits, I estimate that there are slightly more, but still less than 100 speakers. Nawat is an Uto-Aztecan language and is a member of the Nahua subgroup (Campbell 1985). It is spoken in western El Salvador, and today most of the remaining speakers live in Santo Domingo de Guzmán, near Sonsonate.

The CALL materials developed fall into the tool classification (Levy 1997). They consist of lessons (with conversations, vocabulary, explanations and interactive exercises), a dictionary, a simplified grammar and cultural information. The lessons mainly consist of conversations in written and audio formats and also a translation. (Note that the Nawat courseware is available with both English and Spanish as the language of instruction). The learner is provided with language learning tips (adapted from Oxford 1990) and a learner can learn in a manner that suits his/her own learning style (e.g. reading before listening or listening before reading the transcription). Learner autonomy (Little 1991) is gently encouraged and the learner is not forced to do things in a specified order, although guidance is provided as learners, especially beginners, find autonomy difficult.

Figure 1 shows an example of a section page from lesson 1 of the Nawat courseware. A menu of all the major parts of the system is provided on the left-hand side of the screen. Culturally non-specific icons from the University of Victoria collection (Uvic 2001) are used for the section components (conversation, interactive activity, explanation and vocabulary). Culturally specific components are used for the section image (in this example, a woman with a basket on her head is shown waving to a man with a hat). A conversation can be heard in its entirety or sentence by sentence. A translation is also available.


The CALL courseware also provides a forum for the provision and expression of cultural information. The cultural information currently provided is very lean, but it could be further augmented with extra material. A song in Nawat, composed by Paula López (one of the informants for the courseware) is provided with the courseware. Future versions could include further songs and stories. For example, Genaro Ramírez (the male informant for the courseware) has many songs and stories that could be added to the courseware. Researchers at the Universidad Nacional de El Salvador have expressed a wish to place anthropological and ethnographical information that they have gathered over the years online, possibly integrated with the CALL courseware.


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[Learning tips](#)
[How to do a Lesson](#)


Lessons:
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[Lesson 3](#)
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Tools:
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Nawat language program

[Section 1](#)

[Activity 1](#)

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[Help](#)






Lesson 1 yehyek tunal (Greetings)

Tip: Group words together based on type, topic or similar grouping. Example: you can group together all the words to do with food

Section 1 yehyek tunal

(Hi, how are you?) 



	Genaro:	yehyek tunal
	Paula:	yehyek tunal
	Genaro:	ken tinemi?
	Paula:	naha ninemi yek. wan taha?
	Genaro:	nusan yek padiux.

[Translation](#)

Figure 1. An example of a section page from the Nawat courseware.

4. FINDINGS. The project was warmly received in El Salvador. Nawat, like many ELS, has had a difficult history. The language was on the decline in the early 20th century, which was accelerated by government suppression of the language and the Pipil people after an uprising in 1932. Most indigenous languages in Central America, including Nawat, are referred to as dialects by locals, even though they are unrelated to Spanish. In common with many (most?) ELS, Nawat has low social prestige.

A workshop was held in the Universidad de Don Bosco about Nawat and the courseware (20 July 2001). A television interview (for Channel 12 in El Salvador) and a newspaper article (in *El Diario de Hoy*, July 23, 2001) generated positive publicity for the language. People several generations removed from the community were particularly interested in learning the language and obtaining a copy of the courseware. This mirrors the interest in Heritage Languages in the United States and elsewhere. Concultura, the cultural section of the Ministry of Education and Culture of El Salvador were also interested in the materials and they were formally presented with the CALL courseware, CD and book in July 2001. Despite the past restrictions on the language, Concultura is now happy to work with and on the Nawat language.

Linguists (e.g. delegates at the Linguistic Association of Great Britain (LAGB), Spring meeting 2002; Workshop on American Indigenous Languages (WAIL), 2002; Linguistic Association of Canada and the United States (LACUS), 2002) have reacted positively to the CALL courseware. The positive reaction to the Nawat courseware mirrors that of Arikara (Yellow Bird 1999). Sample lessons have been developed for other languages also (e.g. Tojolab'al, Kabiye & Irish).

The existence of CALL materials, let alone language learning material, does not ensure the survival or revitalisation of any language. It is imperative that the materials are actually used in order for them to be of benefit. However, survival and revitalisation efforts can only succeed if the necessary material is available. The CALL courseware provides a useful resource in this context.

5. CONCLUSION. The majority of the world's languages are in danger of disappearing. To repeat: of the over 6000 languages currently spoken in the world (Grimes 2000), it is estimated that 90% of them are in danger of extinction in the next 100 years (Krauss 1992). Language maintenance and revitalisation is very difficult. Linguists are usually interested in documenting languages, while ELs communities may be more interested in creating language learning materials (although not all communities may be concerned with language preservation issues). CALL provides a mechanism whereby linguists get to document a language (albeit in a different format than usual) and EL communities get online, interactive, modern language learning materials. The CALL courseware combines electronic audio materials, with written transcriptions and translations. The material can be quickly verified and modified as required. This ensures that the quality of the transcriptions and translations is maintained. This paper presents a software template and syllabus that has been developed for the production of CALL materials for ELs. Courseware developed for Nawat (Pipil) is shown and the resulting positive feedback, both from the people in El Salvador and outside, indicates the potential of CALL courseware to contribute to language maintenance and revitalisation efforts.

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II

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APPLYING LINGUISTICS
TO THE REAL WORLD

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A HUMAN LINGUISTIC ANALYSIS OF A NEWSPAPER HEADLINE

LARA BURAZER
University of Ljubljana

THIS FRONT page headline, 'Harrison had love-Haight relationship with S.F.', published in the San Francisco *Chronicle* on Sunday, December 2, 2001, appeared shortly after the death of George Harrison, former Beatle. The headline does not reveal the exact content of the article, but rather subtly hints at it. Upon reading the article, the reader discovers that it talks about Harrison's feelings towards San Francisco, California, based upon his experience with the city in the 60s. In a nutshell, the writer states that Harrison was not particularly impressed by the hippies, who were hanging around the Haight area (short for Haight-Ashbury) and the Golden Gate Park. He did, however, donate funds to the Haight-Ashbury Free Clinic, which kept it afloat.

What is interesting about this headline is that the author, Don Lattin, uses the coined entity *love-Haight relationship* to appeal to his readers' knowledge of the concept of 'love-hate relationship,' as well as to their geographical knowledge.

We propose here a plausible testable human linguistic (HL) theory that can handle puns (Yngve 1996; all page references refer to Yngve 1996). Issues of testing the theory are addressed in section 5.

1. THE PRELIMINARY ANALYSIS. In the case of headline writing, there are at least two possible HL analyses. The first is that we are dealing with the so called *broadcast* type of direct coupling, where the writer is looked upon as the source, and his readers as individually forming separate linkages with the writer, 'the contact between these linkages being in the writer in the center' (222).

The second possible HL analysis is in terms of the *messenger* type of direct coupling (cf. Figure 1, overleaf), where the coupling consists of two interacting linkages directly coupled through their contact in the messenger, who plays a role part in both linkages. In the case of writing, the messenger is represented by the written record (a prop part), in our case the newspaper featuring the headline.

It follows that the path from the writer to the reader can be viewed as a messenger type of direct coupling, consisting of two separate linkages, [headline writer] and [headline reader].

The first, [headline writer], has as constituents the participant [writer] and the prop [newspaper]. 'Communicative activity in this linkage results in changes in the properties of some of the props constituting the written message,' (228). The second, [headline reader], has as constituents the prop [newspaper] and the participant [reader]. 'Communicative activity in this linkage results in the reader understanding the [headline]' (228). The headline is viewed as one of the (physical) properties of the prop [newspaper] in the form of ink on paper. Only in the plex of the participating

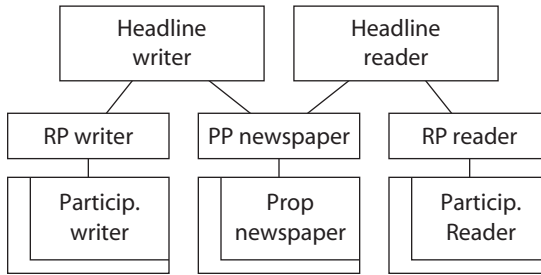


Figure 1. Messenger type linkage representing headline writing and reading.

individuals is the headline associated with other relevant properties relating to what the tradition would call its message.

2. IDENTIFIED PROPERTIES. In HL, the properties which contribute to the piece of communication under investigation are called linguistic properties of a person (123). These are further analyzed in terms of four types of properties: categorial, conditional, procedural and foundational properties (164). The relevant linguistic properties expected in the linkages [headline writer] and [headline reader] can thus be listed as follows:

In the linkage [headline writer]

categorial properties of [writer]:

1. <can speak English>
2. <able to write>

conditional properties of [writer]:

1. <creative writing skills>
2. <employed by the newspaper>
3. <assigned to the article on Harrison>
4. <given adequate time span>

In the linkage [headline reader]

categorial properties of [reader]:

1. <eyesight>
2. <literacy in Latin alphabet>
3. <can read English>

conditional properties of [reader]:

1. <sees the newspaper>
2. <curiosity and interest in reading the headline>
3. <has time to read the headline>

In the case of written records there is always the importance of the prop properties to be considered, in addition to the linkage and the participant properties. The prop in both linkages, [headline writer] and [headline reader], is the prop [newspaper], associated with the following properties by the communicating individuals:

categorical prop properties of [newspaper]:

1. <printed in Latin alphabet>
2. <featuring attractive headlines>

conditional prop properties of [newspaper]:

1. <available to readers>
2. <featuring the news article on Harrison>
3. <featuring the headline relevant to the story>

relating to the headline:

1. <short and concise>
2. <no in/definite articles>
3. <abbreviations where possible>
4. <witty>
5. <shocking>
6. <unusual>
7. <attractive names>
8. <involves a pun>

3.1. THE TASKS <write a headline> AND <read the headline>. We follow the Yngve 1996 analysis in terms of tasks and subtasks. The task <write a headline> is the main task in the messenger type linkage [headline writer], featuring the participant [writer] and the prop [newspaper]. It is carried out through a series of creative thought processes. There are a number of tasks and sub-tasks that can be identified in relation to these processes.

One of the top-level tasks is affected by the conditional properties associated with the prop [newspaper]. These are higher in the linkage hierarchy, possibly in the linkages [management] and [editors], involving observation of proposed newspaper policies and rules concerning front page headlines, observing the deadlines, etc.

The participant [writer]'s parallel processing, and thus simultaneous involvement in different linkages, would in this case involve the participant [writer]'s properties associated with the prop [newspaper] and with the participant [reader] as a member of the identified target group.

The task <read the headline> is the principal task in the messenger type linkage [headline reader], featuring the participant [reader] and the prop [newspaper]. The execution of this task triggers a number of sub-tasks in the plex of the reader involving, simultaneously, properties generally and specifically relating to the message.

In written communication, the participant [writer] only connects with other participant(s), [reader](s), after a time lapse. At the stage of the actual writing process, participant [writer]'s connection to participant [reader] is through expectations, as they are defined in HL (cf. 4.1.1.).

3.2. TASK PROCEDURES AND CONTROL PROCEDURES. The following are the task hierarchies resulting from the main tasks in the relevant linkages triggered by the activities in the linkages. The main focus is on the subtasks and the relevant control procedures (cf. Yngve 1996:186, 270) relating to the pun part of the message.

In writer in the linkage [headline writer]:

1. Task <write a headline>
 - 1.1. sub-task <refer to the article on Harrison>
 - 1.1.2. sub-task <include the name Harrison>
 - 1.2. sub-task <make the headline attractive>
 - 1.2.1. sub-task <include a pun>
 - 1.1.1.1. sub-task <refer to opposite emotions>
 - 1.2.1.1.1. sub-task <refer to love>
 - 1.2.1.1.2. sub-task <refer to hate by including Haight>
 - 1.2.1.1.3. sub-task <connect love and Haight with a hyphen>
 - 1.2.2. sub-task <short and concise>
 - 1.2.3. sub-task <no in/definite articles>
 - 1.2.4. sub-task <abbreviations where possible>
 - 1.2.5. sub-task <witty>
 - 1.2.6. sub-task <shocking>
 - 1.2.7. sub-task <unusual>
 - 1.2.8. sub-task <attractive names>

The following control procedure is set as a result of the sub-tasks of <refer to opposite emotions>:

<concept of love>, <concept of hate>, <concept of hyphen connecting names of two related concepts>, <concept of opposite emotions>, <concept of spelling rules> : <write *love-hate*>

The following control procedure is set as a result of the parallel tasks of <refer to Harrison's relationship with S.F.>, <include attractive names> and <include the name *Haight*>:

<concept of Haight Street in S.F.>, <concept of small capitals>, <concept of big capitals to name an entity>, <*Haight* sounds like *hate*> : <write the pun *love-Haight*>

- 1.3. sub-task <refer to the city of S.F.>
 - 1.3.1. sub-task <refer to Harrison's relationship with S.F.>
- 1.4. sub-task <include attractive names>
 - 1.4.1. sub-task <include the name *Haight*>

Each of the identified subtasks breaks down into a number of sub-subtasks, and these possibly break down into a number of sub-sub-subtasks, etc. The focus of this analysis, though, is primarily on the pun.

The properties featured in the control procedures constitute the communicating individual's pre-context. The connotations that are initially brought into the communicating activity by these properties are the ones 'permanently associated [with them] in the categorial and procedural properties,' (289). They represent the communicating individual's domain of control.

The concept of *Haight* brings in a temporary association with the above properties involving love, hate, etc. through conditional properties 'as a result of previous communicative or non-communicative activity or factors from the environment' (289). Both concepts, hate and *Haight*, are a part of relatively narrowly defined referential fields. In order to understand the pun, a *search-and-match* procedure will be triggered in the communicating individual upon registering the pun. The search-and-match procedure for 'love-hate' might turn up matches from the standard referential fields like <opposite emotions>, <psychological term denoting...>, depending on the individual's memory properties at the time of communicating activity.

A search-and-match procedure for '*Haight*' might turn up matches from the standard referential fields like <name of street in S.F.>, <hippies>, <the sixties>, etc., again depending on the individual's memory properties. In the case of reading the pun, '*love-Haight*', the possible matches in its referential fields (both the above mentioned possible matches) represent the pre-context of the communicative activity. In order for the pun to be understood, 'a new context and a recognition of a relationship of similarity between the two [contexts] has to be introduced', (ibid. 292). A relationship of similarity in this case is in the pronunciation: *hate* and *Haight* are pronounced the same, are homophones.

It follows that sames and differences in a pun involving spelling and pronunciation can successfully be used only in written communication. In spoken communication, the relevant communicating individual would have to make these properties explicit to the other communicating individuals.

In reader in the linkage [headline reader]:

- 1. Task <read the headline> requires the following task procedures in order for the control procedure to be executed:
 - 1.1. sub-task <read *Harrison*>
 - 1.2. sub-task <read *had*>
 - 1.3. sub-task <read *love*>
 - 1.3.5. sub-task <read unit as /----/>

<concept of love> : <understand love>

1.4. sub-task <read 'hyphen'>

<concept of hyphen connecting names of two related entities>:
<understand hyphen>

1.5. sub-task <read *Haight*>

<concept of big capitals to name an entity>,
<concept of Haight being a street in S.F.>: <understand Haight>

<*Haight* sounds like /----/,> <*Haight* sounds like *hate*>,
<know love and hate are opposites> : <understand the pun>

1.6. sub-task <read *relationship*>

1.7. sub-task <read *with*>

1.8. sub-task <read *S.F.*>

4.1. ACTIVITIES IN THE PLEX OF THE PARTICIPANT [writer] IN THE LINKAGE [headline writer]. Because the article focuses on Harrison's relationship with Haight the writer's initial sub-tasks of <write a headline> are possibly <browse through memory>, <repeat the sound of *Haight*>, <find properties similar to *Haight*>, <find properties including *Haight*>, <find properties relating to *Haight*>, and the like.

The search-and-match procedure for <find properties relating to *Haight*> turns up a match in <*Haight* sounds like *hate*>. This brings the entity HATE in wait to the temporary storage.

Now the search-and-match procedure is set for entities including *Haight* or *hate*. One match is <love-hate relationship>, based on the property <*Haight* sounds like *hate*>, which is now an entity in wait. The next search-and-match procedure is set for properties simultaneously relevant to love-hate relationship, Haight and Harrison, which might turn up a number of properties ranging from closely to loosely related to these entities. Some of the results of the search-and-match procedure might be:

<Harrison didn't like Haight>, <Harrison didn't like the hippies>,
<Harrison helped Haight financially>, <Harrison visited Haight>,
<Haight is a poor area>, <Haight needed financial support>,
<love-hate deals with opposite emotions>, etc.

A selection among these properties is then made in order to incorporate the ones relevant to the task of <include a pun>, relating to the super-ordinate task of <write a headline>, relating to the super-ordinate task of <write an article on George Harrison>.

The next task in the writer is <write the pun>, which requires incorporating the following properties:

<short and concise>, <no in/definite articles>, <abbreviations where possible>, <witty>, <shocking>, <unusual>, <attractive names>

following newspaper policies and rules on space and redundant elements.

The writer includes <Harrison> to satisfy the headline criteria of using <attractive names>, <love-hate relationship> to make the headline <shocking>, and <love-Haight relationship> to make the headline <attractive>, <witty>, <shocking>, <unusual>, and most of all <short and concise>.

The <search> and <selection> tasks might have been accompanied by the simultaneous task of <graphical representation> of these entities, involving the sub-tasks of <write down> × <spell out>.

The final selection among the possible headlines is a result of all the above stated tasks and subtasks, and incorporates all the relevant properties to satisfy the newspaper policies and rules.

4.1.1. EXPECTATIONS IN HL. In the linkage [headline writer], one of the relevant tasks of the participant [writer] is <include a pun>, which after the participant [writer]'s selection process narrows down to the sub-tasks <refer to *love-hate relationship*> and <refer to *Haight*> simultaneously. By completing these tasks the participant [writer] sets up an expectation procedure. The expectation is that the newspaper headline containing the pun *love-Haight relationship* will trigger certain tasks and sub-tasks in the participant [reader]'s plex in the linkage [read the headline], in case the event of reading occurs.

By incorporating the pun *love-Haight relationship* in the headline, the writer is setting up the expectation that the reader will recognize the pun. On the lower level of observation the reader is expected to carry out at least the following subtasks of the task <read the headline>:

<read the pun as *love-hate*>, <remember *love-hate*>, <remember *Haight*>, <remember opposite emotions>.

The writer's expectation is also that his reader will have in his plex the properties relevant to these tasks, such as:

<literate in Latin alphabet>, <can speak English>, <familiar with the SF Bay Area>, <love-hate are opposite emotions>, <Haight is a street in S.F.>

The other properties relating to complete understanding of the headline can be obtained upon reading the article and are not among the relevant properties in completion of the task <read the headline>.

Participant [writer] provides the message triggering the *input pulse* in the reader, the pun <love-Haight relationship>. The results of the activities in the plex of the participant [reader] provide the post-context triggering the *output pulse*, the pun refers to <love-hate relationship × Haight>' (following an undeterminable time delay Δt), in which case the expectation procedure has been executed successfully.

The writer's expectation in relation to the reader can only be satisfied, set to – *expectation*, by means of feed back from the reader after having read the headline. Otherwise the writer's expectation remains at the *expectation* value.

4.2. ACTIVITIES IN THE PLEX OF THE PARTICIPANT [reader] IN THE LINKAGE [headline reader]. Upon buying the newspaper and taking the time to read the headlines, the reader has satisfied the expectations of the newspaper personnel—the editors, the writers, the managers, etc. The reader's expectation in wait is that the headlines will include (at least some of) the following properties:

<English language>, <Latin alphabet>, <include a pun>, <short and concise>, <no in/definite articles>, <abbreviations where possible>, <witty>, <shocking>, <unusual>, <attractive names>.

Upon reading the headline on Harrison, in the reader's plex a number of expectations are set to *expectation*. An informed reader who is familiar with *love-hate relationship* would expect after reading LOVE and the hyphen that the following item would have to be HATE. In this case, the properties of the participant [reader] <familiar with English spelling rules> × <familiar with English pronunciation rules> × <familiar with Haight> are not relevant.

It follows that there are a number of possible ways for the reader to read *Haight* the same as *hate*:

1. the reader is familiar with the pronunciation and spelling rules of English and therefore realizes that *Haight* sounds like *hate*
2. the reader is familiar with *Haight*, has heard of it before
3. the reader guesses at the pronunciation of *Haight* without knowing the specifics of spelling and pronunciation rules of English, as well as without having heard of Haight before. The guess is made on the basis of familiarity with *love-hate*.

In the latter case the expectation procedure is set in the reader that the following element in the headline, HAIGHT, is pronounced like HATE.

At this point, parallel expectations in wait in the reader are:

- the element following LOVE- is pronounced HATE
- *love-Haight* is a pun
- the writer is referring to love-hate relationship towards Haight
- Harrison had a love-hate relationship with Haight and S.F.

The value of the expectation procedure remains at *expectation* for the duration of the reader's search-and-match procedure for the element HAIGHT. When the activity in the plex of the reader is successful in matching the HAIGHT element with the property of <HAIGHT sounds like HATE>, the expectation turns to – *expectation*.

The visual channel provides the additional property of <mid-sentence capital letter in Haight indicates a name>. It follows that *love-Haight* means both, hate and Haight, which suggests a word play, a pun.

The expectation procedure of <includes a pun> is satisfied and thus set to – *expectation*, along with the simultaneous expectations of LOVE- is followed by /heit/ and *love-Haight* is a pun.

The pun expectation is satisfied in the reader because the item *love-Haight* does not refer to anything in the referential field of the pre-context (*love-Haight* is not a well known or widespread unit) to gain a position of property in the reader, it has to be interpreted by the reader, made sense of. So, it's either nonsense or it is a pun.

The expectation procedure referring to Harrison having had a love-hate relationship with the city of S.F., in particular with the Haight area, is set to – *expectation* in case the reader's search-and-match procedure turns up the properties of:

<Harrison had a relationship with Haight>, <Harrison didn't like Haight>,
<Harrison helped Haight>.

These results can be reached by way of:

- searching through the properties on Harrison and Haight stored in the reader's memory and selecting the ones relevant to the pun;
- making an assumption that the writer had indeed based the coined pun on these properties;
- reading the article and thus activating the relevant properties in the plex of the reader.

The entity *love-Haight*, initially appearing to be nonsensical in having the property of <not referring to anything in the referential field> is thus given new properties:

<a pun>, <referring to love-hate>,
<referring to Harrison's relationship with Haight>.

In the case of this headline, the pun *love-Haight* is given a new context, a new domain of control (relates to Harrison and his relationship with S.F.). The property <Haight sounds like hate> is given prominence over other familiar properties such as <love-hate refers to a person having strong but mixed feelings toward an entity>, <Haight is a name of a street>, <hippies are related to Haight>, and many others.

Love-hate relationship is recycled through HATE being a homophone of HAIGHT. Since both, hate and Haight, are relevant to the subject of the article, the parallel activi-

ties in the plex of the participant [writer] make a selection, blend the two items together, thus producing a pun and at the same time saving some valuable front-page space.

The task of the reader is to detect the new context and the prominent properties in it. Some readers may fail at doing that, but the writer's selections are based on expectations that his readers are mostly residents of S.F., familiar with the 60s, the Beatles, the hippies, etc. But primarily on his expectations that the readers are English speakers, literate, familiar with the Latin alphabet and know how to pronounce Haight, based on their experience or theoretical knowledge, in addition to their experience with newspaper headlines involving puns. Feedback on this subject would have a valuable position of setting the writer's outstanding expectations to *-expectation*.

5. IN CONCLUSION: TESTABILITY OF THE PROPOSED DATA. The proposed analysis is based on the author's intuitive guess from introspection (285). The reader part of the analysis can be justified by the fact that the author is a member of the writer's audience, and is thus a suitable informant. The writer part is a plausible hypothesis based on the author's general experience with writing. In order to obtain scientific confirmation of the results of the analysis, experimental testing would have to be performed.

A way of obtaining evidence for understanding the pun would be to show subjects the first part of the headline up to LOVE followed by the hyphen and ask them to guess at the following element. The second part of the experiment would involve showing the subjects the complete headline and asking them to read it out loud. The third phase would involve testing what question words would be appropriate for questioning various parts of the message.

The last part of the experiment would involve reaffirming the compiled data by checking back with a writer. If as a result of this the value of his expectations was set to *-expectation*, the task of obtaining the data for the understanding of the headline would be marked successful. A reasonable number of differences are expected to occur in identified task hierarchies, expectation procedures, and related properties because of the idiosyncratic nature of individuals' plexes.

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LOOKUP METHODS FOR CHINESE CHARACTERS: ELECTRONIC VERSUS PAPER MEDIA

DAVID CAHILL
Roosevelt University

THE QUESTION of whether electronic or paper media are superior in terms of convenience and speed for looking up Chinese characters can, with one important qualification, be answered fairly easily: electronic dictionaries are superior to paper dictionaries. The qualification is the decidedly different circumstances of native and nonnative speakers in looking up or entering Chinese or Japanese (i.e. *kanji*) text. Native speakers, with their phonetic knowledge of the language, can make use of the fastest paper and electronic lookup methods, which are generally phonetically based. Nonnative speakers, with their incomplete phonetic knowledge, must rely on the slower and more cumbersome structural lookup methods, that is, methods based on the structure of Chinese characters rather than on their sound. Any Chinese character can be looked up with knowledge of the basic principles of structuring Chinese characters. This is not the case with phonetic lookup methods, which require a phonetic knowledge of each and every character. Yet it is often to learn a character's pronunciation that the nonnative speaker looks up a character in the first place. This stumbling block applies to both paper dictionaries and electronic dictionaries and input media. In fact, Chinese and Japanese lookup and input media in general merely apply and extend the lookup principles that have organized character dictionaries for hundreds of years. As this paper will argue, recent innovations in several Japanese-English paper character dictionaries can be profitably applied and with great benefit for nonnative speakers not only to Chinese-English character dictionaries but also to lookup and input software in both languages. To understand the innovative nature of these recent dictionaries, it is appropriate to begin with a discussion of traditional paper character dictionaries.

1. TRADITIONAL CHARACTER DICTIONARIES. Before phonetic lookup methods were devised, Chinese dictionaries necessarily organized characters on the basis of their structure. From as early as 100 A.D. characters were analyzed into parts and 540 of these parts were designated as common classifiers known as *bushou* (traditionally called 'radicals' in English). In the Ming Dynasty (1368–1644) the number of radicals was reduced to 214, a list that was adopted by the influential 47,035-character *Kangxi Zidian* (*Kangxi Dictionary*) of 1716 and retained largely unaltered until modern times in most Chinese and Japanese character dictionaries, though some dictionaries have reduced the number of radicals to 189 or 170 or thereabouts by eliminating radicals of obscure characters or considering some radicals to be variants of others (Ann 1987; Yin & Rohsenow 1994). The three-step 'radical stroke-count method' (*bihua*)

of looking up characters works by locating 1) the radical of the targeted character in a radical index, 2) the same radical in a second index listing all characters under each radical along with page or reference numbers for the character entries, and 3) the character entry on the appropriate page. This 2,000-year old radical system remains the most feasible and practical method of organizing Chinese and Japanese dictionaries for relatively convenient, if somewhat slow, lookup of characters on the basis of their structure. Its main advantage over other possible structurally-based lookup methods lies in the fact that it is a *motivated* classification method, that is, it follows naturally and logically from the way Chinese characters are composed.

In their early development (3,000–1,000 B.C), characters were largely pictographic but shifted to picto-phonetic or more accurately semasio-phonetic structure during this period, so that by the time of Xu Shen's 9,353-character *Shuowen Jiezi* (*Analysis and Explanation of Characters*) of 100 A.D., over 80% of characters were semasio-phonetic and only some 300 characters or 3% (of complete dictionaries with typically 10,000 characters) were genuinely ideographic or pictographic, a proportion which holds today, according to conventional character-type classification schemes (Ann 1987; Yin & Rohsenow 1994). Semasio-phonetic characters—that is the large majority of characters—typically contain a semantic component and a phonetic component. Since many characters with the same phonetic component have the same or similar pronunciation, the phonetic component lends a rough guide to the pronunciation of characters. The semantic component is the radical. Grouping characters by their semantic component makes sense, as they tend to share related meanings. Characters with the fish radical, for example, refer to different kinds of fish; characters with the thread radical, generally refer to textiles, strings, the act of tying or joining, and other associated meanings. Grouping characters by radical also aids in their learning and retention in the memory and provides valuable insight into the origin and historical development of Chinese characters. It is additionally a more reliable way of ordering characters than by phonetic component. All characters ultimately derive from the radicals, which are the building blocks of characters. By contrast, the phonetic component can accurately predict pronunciation for only 30% of semasio-phonetic characters, while 22% of all modern Chinese characters are polyphonic—having more than one accepted pronunciation (Yin & Rohsenow 1994). Numerous characters have no identifiable phonetic component at all.

The radical stroke-count lookup method presupposes a minimal structural knowledge of Chinese characters and must be learned and practiced by the newcomer to the language. Even with practice it will always remain a slower method of looking up characters than with phonetically organized dictionaries, explaining why native speakers themselves prefer phonetic lookup methods. The radical stroke count-method requires that one be able to 1) identify a character's radical, and 2) count the number of strokes of the radical and of the rest of the character. In most cases, the radical is on the left side, top or bottom, or encloses the character, and can readily be identified. In a minority of cases, the radical is harder to locate. Many characters have more than one component that could be identified as the radical; this is especially

tricky when the radical occupies only a corner of the character. Other characters do not have a radical at all and may be considered either as forming their own class or as radicals in their own right. Dictionaries differ on classifying characters with hard-to-identify radicals and must decide how to handle the exceptions on arbitrary grounds. This demands that users become familiar with the particular rules each dictionary applies to the exceptional cases. Once the radical is identified, the user counts the strokes. While native speakers can generally do this at a glance because the stroke sequences learned in writing characters are standardized in schools, this can present a problem for learners of Chinese or Japanese, who must be able to recognize what constitutes a distinct stroke. Yet once the rules for identifying radicals and correct stroke sequences are learned, looking up characters by this method is fairly simple and straightforward.

2. RECENT INNOVATIONS IN JAPANESE CHARACTER DICTIONARIES. A major improvement in the radical stroke-count method of looking up characters—the first such improvement in its history—took place with the publication of Arthur Rose-Innes *Dictionary of Chinese-Japanese Characters* (1977), subsequently refined and reapplied by the competing Japanese-English character dictionaries of Nelson (Haig 1997), Halpern (1993), and Spahn and Hadamitzky (1996). It is significant that all four dictionaries were devised by nonnative speakers of Japanese, who recognized more acutely the need for an efficient non-phonetic method of looking up characters. To date, no comparable Chinese-English dictionary making use of these innovations has been published.

Using the radical lookup method in traditional Chinese and Japanese dictionaries, the user must consult three separate pages to find a character. For example, to look up the Japanese character, *kō* ‘good, like’, by radical in the *Shinjigen*, a 9,920-character Japanese dictionary for native speakers, one must go to the radical index on the inner flap and then to pages 251 and 252 in turn to find the entry (Ogawa, Nishida & Akatsuka 1982). To look up the same Chinese character, *hao* (‘good’), by radical in the *Concise English-Chinese Chinese-English Dictionary*, published in the People’s Republic of China, one must go to pages 3, 16, and 172 respectively to find the entry (*Concise* 1986). In the *Far East Chinese-English Dictionary*, published in Taiwan, one must go to pages 1, 13, and 321 respectively (Zhang 1993). This three-step process imposes a great burden on the memory load of the user, who must keep more than one item in mind at each step. After finding the appropriate radical in the first index, one must remember the page or reference number of the radical to find it in the second index while at the same time having to remember the number of residual strokes of the character to find it listed under the appropriate radical in the second index, and finally the page or *phonetic* reading of the character to find the character entry itself. Without steady concentration, one easily forgets one or more of these items in the process, forcing one to start over.

By contrast, the Rose-Innes, Nelson, and Spahn and Hadamitzky Japanese-English character dictionaries have dispensed with the need for indexes by the simple expedient

of listing all radicals under a given number of strokes along the margin edge, enabling quick lookup by thumbing, progressively narrowing down the pages directly to the character entry, like an alphabetical dictionary. The Spahn and Hadamitzky works the same way as the Rose-Innes and the Nelson, except that it reduces the usual 214 historical radicals to a more economical 79 radicals by grouping variants together and consigning less common radicals to a separate section of non-radical characters. For example, to look up the same Japanese character, *kō*, in the Spahn and Hadamitzky dictionary, one flips the pages to the section of the dictionary with three-stroke radicals, and then to the woman radical subsection indicated with an arrow next to the radical and the number of residual strokes (two), finding the character entry listed as the first character under the two-stroke subsection on page 691. The Halpern dictionary works somewhat differently—indicating on the margin the spatial components of characters rather than the radicals—but the lookup principle is the same. To look up *kō* in the Halpern dictionary, one flips the pages to the section with left-side radicals (indicated by a box with the left side shaded) and then to the ‘3–3’ subsection (characters with three-stroke radicals and three residual strokes), finding the character entry listed as the ninth character under the 3–3 subsection on page 119¹.

Although a certain inconvenience remains in having to flip through the last few pages to find a character entry in these three dictionaries, this generally takes no more than a few seconds, and is more than offset by the absence of indexes. It is essentially a one-step versus the three-step process of traditional character dictionaries: having found the radical, one need only remember the number of residual strokes. Once the user becomes adept at using marginal lookup by thumbing, many characters can be found in seconds. Some traditional Chinese and Japanese character dictionaries that are organized structurally rather than phonetically (e.g., Ogawa, Nishida & Akatsuka 1982; Zhang 1993) also contain radical entries listed on the margins but with a crucial difference: only single radicals corresponding to their section are listed at a time, not all the radicals under the same number of strokes. This shortcoming eliminates the possibility of relying on the margin itself to look up characters by their radical; they must still be looked up in the index.

In any case, it is faster to look up characters in phonetically organized Chinese and Japanese dictionaries. An informal self-administered test by the author revealed that a phonetic lookup speed of six characters per minute was attainable for a typical Chinese-English *pinyin* dictionary (*Concise* 1986). Four characters per minute was attainable by marginal radical lookup for the Spahn and Hadamitzky and the Halpern dictionaries, compared with two characters per minute by traditional three-step radical lookup for Chinese and Japanese dictionaries with radical indexes (*Concise* 1986; Ogawa, Nishida & Akatsuka 1982; Zhang 1993)². This double increase in speed between the latter two dictionary types is highly significant. It means that 100 characters can be looked up in half the time it takes with traditional dictionaries. By greatly easing the process of looking up characters by radical, nonnative speakers and learners of Japanese now have a reasonably fast and easy method of accessing characters whose pronunciation is unknown. It remains to create a Chinese-English character

dictionary based on similar principles as the Rose-Innes, Nelson, Spahn and Hadamitzky, or Halpern Japanese-English character dictionaries.

3. QWERTY KEYBOARD INPUT METHODS. The fastest methods for entering Chinese or Japanese text rely on the standard QWERTY keyboard. Short of future developments in telepathy, no other mechanism even approaches the speeds attained using the traditional typewriter keyboard. In one contest, speeds of 606 characters per minute were attained using Japanese *romaji* input, and 321 characters per minute using *hiragana* input³. The fastest recorded speed for the *Wubi Zixing* or 'Five-Stroke Form' Chinese input method (itself the fastest known input method for Chinese) is 293 characters per minute⁴. In contrast, the fastest input speed for any non-QWERTY input method or mechanism (reviewed below) is 140 characters per minute, claimed for a Chinese speech recognition device⁵. Standard *pinyin* input speeds for competent users (such as required in secretary job postings) of Chinese range from 80–120 characters per minute; standard Japanese *romaji* and *hiragana* input speeds would certainly be even faster than Chinese if 'characters' (*moji*) per minute include easy-to-enter *kana* as well as *kanji*. Far from being a foreign medium unsuited to the Chinese/Japanese character, the Latin keyboard has been adapted by both the Chinese and the Japanese to their own ends and turned into the fastest input medium yet conceived. The reason for this has nothing to do with the inherent properties of the Latin alphabet; the alphabet functions merely as an arbitrary code, chosen among other possible codes as a result of its conventional international status and familiarity. The advantageous property of the QWERTY keyboard layout, besides its conventional status, seems to be that it is well suited to the hands, in that the rapid simultaneous motion of all ten fingers can be fully exploited.

It will be noted that the fastest Japanese input methods (*romaji*, *hiragana*) are phonetically based, while the fastest Chinese methods (*Wubi Zixing* or similar input methods) are structurally based. The major challenge of structurally-based input methods is to develop a system for calling up several thousand commonly used characters with a minimum of keystrokes that is also faster than existing phonetically-based *pinyin* (*Quanping*, *Shuangping*) or *zhuyin* (otherwise known as Mandarin Phonetic Symbols) input methods. The inherent limitation of *pinyin* (or *zhuyin* for that matter) input is the long list of homophonous characters that many *pinyin* sequences call up, from which one must choose the targeted character. The appeal of structurally-based input is the direct and instantaneous calling up of targeted characters by code, bypassing the extra step of searching for characters from a list of homophones. For example, using the *Wubi Zixing* method, the Chinese character *bie* ('other') can automatically be called up and inputted by the four-letter code KDMY; no other character is accessible by the same code. Likewise, using the *Wang Ling Kuaima* method, *bie* is inputted by the sequence BLGG. Once learned, structurally-based input methods are indeed capable of great speed and in general have proved faster than purely phonetically-based input methods.

Structurally-based input methods have, however, two major drawbacks. One is that they are necessarily mediated by an arbitrary alphabetic or numeric code, that

is, a code with no intrinsic relationship to the Chinese script. Phonetically-based input methods are also mediated by an arbitrary code—the roman alphabet—with the decisive difference that the roman alphabet, universally taught in schools worldwide and learned by much of the world's literate, has attained a prestigious and normalized status and has virtually lost its arbitrariness even in non-Western societies such as China and Japan⁶. The *pinyin* and *romaji* 'codes' used to phonetically enter Chinese and Japanese seem, as noted above, utterly natural to their native Chinese or Japanese-speaking users, not to mention the fact that the QWERTY keyboard is already organized around the roman alphabet⁷.

The second major drawback is that an invariably complex classification scheme for assigning codes to structural elements must be learned and automated if any structurally-based input system advertising pitches that they are easy to use to the contrary is to be usable at all. Structurally-based input methods analyze characters into their structural components, in some cases into their individual strokes or stroke types. Most of these methods emerged from two methods developed in the pre-computer era for referencing characters, Wang Yunwu's 'Four-corner' method and Li Jinxi's 'Five-stroke form' or *zha* method (Huang & Huang 1989; Yin & Rohsenow 1994). Depending on the particular input method, structural components or stroke types are classified into basic types or patterns, each coded with a number or letter; the sequence of numbers or letters (typically four digits) identifies the character. In the case of the Wubi Zixing method, this entails knowing the type of the first component, the second component, the last stroke, and the overall shape of a character, and then mentally to convert these component types into the corresponding code. Some methods (e.g., *Erbi*, *Wang Ling Kuaima*) work by assigning one or two digits of a character's code to phonetic components (e.g., the initial letter of the *pinyin* reading) and one or two digits to structural components. All structurally-based input methods are similar in principle: characters are arbitrarily assigned mediating codes based in whole or part on their shape and structure, and these codes must be practiced until automated in the memory if the user wishes to actualize the method's potential, not to mention that the method can grind to a halt even for native speakers needing to enter the occasional rare character whose pronunciation or shape is unknown. Both drawbacks make structurally-based input systems notoriously hard to learn, far more difficult for the newcomer than looking up characters by radical, and severely limiting their popularity among native Chinese users as well. Moreover, they must also be used regularly or they are quickly forgotten, and they are better suited to copying than to composing text due to the mnemotechnic load involved in mentally converting characters to code (Rohsenow 2001).

4. OTHER ELECTRONIC INPUT METHODS AND DEVICES. We will consider three types: thumb-based devices, stylus-based devices, and speech-recognition devices. Thumb-based devices primarily refer to cell phones. Figures are currently lacking on the number of habitual Chinese and Japanese users of web-based cell phones (i.e., cell phones that can be used to transmit and receive email messages), but the number is

probably in the tens of millions. It is many users' sole or primary method for entering text. Speeds of up to 100 characters per minute by means of the thumb have been recorded (Brooke 2002). Here the simplicity and economy of phonetic input merges with the popular technology of cell phones. The twelve-key cell phone keypad (identical to the standard telephone numeric keypad with groups of three roman letters assigned to ten of the keys) is essentially a simplified QWERTY keyboard and accordingly relies on phonetic *pinyin* or *romaji* input, facilitated by arrow keys for identifying characters and choosing among homophones. For an illustration of how cell-phone input works and how adept practiced users can be, the reader is referred to a recent Japanese movie, *Platonic Sex* (2001, dir. Matura), whose plot revolves around the cell-phone email messages of a pair of teenage lovers, a movie which tellingly illustrates the central place web-based cell-phone communication already occupies in Japan and to a lesser though increasing extent elsewhere in Asia. Handheld translation dictionaries can also be considered under the category of thumb-based devices in that the thumb or finger is used to enter words, except that a miniature pushbutton QWERTY keyboard replaces the standard telephone keypad. More expensive translation dictionaries enable words to be entered by stylus, with the attendant advantages of stylus-based technology.

Stylus-based input devices involve the use of a small plastic or metal stylus that registers on a touch-sensitive pad on hand-held devices or in the colloquial term 'palm pilots.' (Some laptop computers additionally have a touch pad in lieu of a mouse, on which a stylus or the finger can be used.) Due to their compact size and power, hand-held devices are gaining increasing acceptance, typically among educated professionals. Some of these devices can be converted into a conventional computer when a portable retractable or foldable QWERTY keyboard is attached.

Among the more cutting-edge of these devices is the POBox, standing for 'Predictive cOMposition Based On eXample', developed at Sony Corporation by Toshiyuki Masui (Masui 1998, 1999). This hand-held device employs a stylus on a touch-sensitive screen for inputting Japanese text. Unlike standard hand-held devices, by which choices of text are made by scrolling up or down with arrow keys, the POBox calls up characters, words, phrases and even sentences with pop-up boxes or what he calls 'dynamic menus' that predict the subsequent text on the basis of context and the user's previously inputted text. What makes the predictive capability of the POBox superior to other Japanese and Chinese input software that can predict compound words from single characters is that its predictive capacity is more truly active in that it predicts not only words but also phrases and sentences by means of the user's interactive input. However, until it matches the fastest web-based cell phone input, the POBox's relatively slow speed of 40 characters per minute will likely prevent this impressive device from competing with cell phones for market share. Nonetheless, it can be expected that the technological advances of all these devices will merge and ultimately be universally adopted.

As for handwriting-recognition devices, which also employ a stylus (or finger) on a touch-sensitive pad, certain inherent limitations will probably prevent this method

from ever attaining general popularity. The first major drawback is speed, since natural handwriting averages only 20 characters per minute for Chinese and up to (a still rather slow) 50 *hiragana* (as opposed to *kanji*) characters per minute for Japanese (Huang & Huang 1989; Masui 1998). Shorthand techniques of writing would of course potentially enable much faster inputting speeds, but even shorthand is constrained by the second major drawback, the problem of device-reading errors. Handwriting-recognition devices work by progressively predicting the character being entered on the basis of each successive stroke. Anecdotal evidence reveals that users of these devices invariably experience frustration over the fact that each stroke must be drawn precisely or the device may misinterpret the character, requiring the user to keep starting the character over again until the correct character is understood by the machine. It can hardly be considered handwriting in the normal sense since the user must learn an unnatural and awkward way of writing characters. It is not known whether handwriting-recognition technology will be capable of overcoming this reading-error problem to the point that it becomes an attractive option to general users. In any case, it is doubtful that it will ever approach the speed of QWERTY keyboard input.

Finally, let us consider speech-recognition technology. Certainly this is the simplest and most economical of all input methods and devices. The object to be entered into the computer and the means of doing so are one and the same: language in its natural and effortlessly spoken state. The technology shows great potential. Existing speech-recognition devices are affordable and boast speeds of up to 140 characters per minute⁵. On the other hand, it remains to be seen whether this method of input will ever earn the majority's preference. Its appeal—and the limits of its appeal—can be compared to dictation devices. The big advantage of speech-recognition devices over traditional dictation tape recorders, of course, is that speech is inputted directly in the form of computerized text and does not need to be separately transcribed into the computer. Yet many people are uncomfortable with oral-based input, preferring the apparent or felt sense of the precision of text-based means of recording language. Another drawback is the matter of privacy. There are understandable reasons for not wanting to speak into a device in the presence of others: one may be highly self-conscious engaging in activities that draw attention to oneself, one may have confidential information to impart, or one may not wish or be allowed to disturb others by one's own talking into the computer in certain environments such as the workplace or the library. Such external constraints narrowly confine speech-recognition devices to a private environment.

5. ECONOMY, SIMPLICITY, TRANSPARENCY. Linguists have made the distinction between writing systems that are 1) economical, 2) simple, and 3) transparent. The same may be applied to any rule-based system, including input and lookup systems for Chinese characters (Coulmas 1989; Yin & Rohsenow 1994). Economical systems are those that involve a minimum of rules (signs, in the case of writing systems) and are therefore easy to grasp and learn, but not necessarily easy to use in practice because the paucity of rules fails to cover the exceptions. Simple systems are those that are more complete

and easy to use, with the perfect balance of rules to exceptions, but harder to learn due to the greater number of rules. Transparent systems are the most complete and exhaustive, with a rule for every exception, but therefore the hardest to learn and to use because of their complexity.

Alphabetic lookup and input systems for Chinese (*pinyin*) and Japanese (*romaji*) are both highly economical, with only 26 letters to learn, and relatively simple despite the problem of homophones (exceptions to the rules). Of all structural input and lookup methods, the simplest and most economical would seem to be stroke count, as only a single rule in principle applies: count the number of strokes per character. In practice, this is not so simple and economical. Of the 11,834 characters in the *Ci Hai Dictionary*, for example, there are more than one thousand characters each with eight, nine, ten, eleven, twelve and thirteen strokes (Yin & Rohsenow 1994). Obviously it is not convenient to run one's finger over or scroll down a list of 1,000 characters to find a character one is looking for with, say, nine strokes, even when all the characters with nine strokes are arranged by subsidiary ordering rules, such as grouping all characters of the same radical together, and after that by the same phonetic element, etc. The more the method must be supplemented by subsidiary ordering rules, the less economical and simple it becomes. Inputting or looking up characters by the *pinyin* method runs into the same problem though less seriously so with homophones (which must be listed by subsidiary ordering rules), a problem greatly obviated, however, by whole-word (compound) input and whole-word *pinyin* dictionaries (e.g. Bai 1996; DeFrancis 1996). It must be pointed out, however, that the inherent problem of encoding and inputting characters by any method (structural or phonetic) often compels native Chinese and Japanese users to resort to English instead, particularly for time-intensive activities such as chat and instant messaging (O'Hagan & Ashworth 2002). Still, due to its simplicity and economy, *pinyin* remains the most the most popular input system for native Chinese users and *romaji* input and *hiragana* lookup for Japanese users.

Systems satisfying the third criterion, transparency, are those in which ambiguity is reduced to a minimum. One thousand characters under the classifier 'nine strokes,' for example, renders this classifier highly ambiguous. Similarly, in the 7,331-character *Far East Chinese-English Dictionary*, 149 homophonous characters listed under the *pinyin* reading of, say, *yi*, is unsatisfactorily ambiguous. We may reduce the number of homophones by designating the appropriate tone, but only to a degree: there still remain 78 characters under *yi* with the fourth tone, for example (Zhang 1993). The very reason structural input methods such as *Wubi Zixing* were devised was to bypass the ambiguity problem by assigning a code to every character (i.e. a rule for every exception), enabling characters to be accessed directly, thus eliminating the problem of homophones. The catch is that a complex list of rules must first be learned and assimilated; the transparency gained comes at the cost of simplicity and economy. Paper character dictionaries organized according to analogous structural methods (e.g. Chen 1992) have the same burden of difficulty.

For our purposes, what the above methods and devices have in common is that they are not feasible for nonnative speakers of Chinese or Japanese, despite their

simplicity and economy for native users. Except for the structurally-based input methods, all of the above-discussed methods require a thorough phonetic knowledge of the language. To be sure, with years of practice and experience, fluency is possible and a more or less complete phonetic knowledge of characters indeed attainable for determined nonnative speakers. But this is hardly the case for the vast majority of nonnative learners and speakers of Chinese or Japanese. Even if one has learned and acquired 90% of the roughly 3,000 frequently used characters of Chinese or the 2,000 frequently used characters of Japanese, including the thousands of character collocations in both languages forming crucial compound words used in everyday speech, one will inevitably and all too frequently bump up against characters in written texts for which the phonetic reading is uncertain or unknown. Each such instance requires looking up or inputting the character by means other than the phonetic, and this, if only momentarily, renders all phonetic input/lookup methods useless. The very reason why one is looking up the character is to learn its phonetic reading. Some structurally-based input methods do not require a phonetic knowledge of characters in order to be used, while many others (e.g. *Wang Ling Kuaima*) do and this renders them useless for the same reason as well. However, methods that do not require a phonetic knowledge such as *Wubi Zixing* are not necessarily any more feasible or practical for nonnative speakers of Chinese than phonetically-based methods, due precisely to their transparency, that is, their difficulty and their profusion of rules, but again, what is required first of all is an easier means of looking up and inputting characters. The final argument against structurally-based input methods is that they remain a hard sell even for native speakers of Chinese, who find phonetically-based input methods far easier and more practical.

6. CONCLUSION: APPLYING RADICAL LOOKUP INNOVATIONS TO ELECTRONIC MEDIA.

The innovative designs of the Rose-Innes (1977), Nelson (Haig 1997), Halpern (1993), and Spahn and Hadamitzky (1996) Japanese-English character dictionaries discussed above (section two), whereby radicals are spread out along the margins for quick thumbing, could easily be adapted to electronic format by exploiting the properties of drop-down and pop-up menus, which can be regarded as the electronic equivalent of margin tabs on paper dictionaries. The nature of drop-down and pop-up menus is that they stay in place while one drags the cursor over the menus, allowing one to go forward or backtrack in a single gliding motion much like using the margins of a paper dictionary to page back and forth and progressively narrow down the pages to the targeted character. Using a stylus on a handheld translation dictionary with pop-up menus or a mouse with a standard computer input program, the user could open up sequential drop-down and pop-up menus displaying 1) all radicals under a given number of strokes, 2) number of residual strokes, 3) all characters under a given number of residual strokes, and 4) character entries with compound words (and reverse compound words) and English definitions, with the option of inputting any character or word into text for word-processing or email (in the case of web-based cell phones). With such developments, Chinese and Japanese electronic lookup and

input media would be truly democratized, in allowing relatively fast and convenient accessing of characters by nonnative speakers and learners with incomplete phonetic knowledge of the language.

- ¹ The residual component of the Chinese character *hao*, itself a character meaning 'child,' may be variously interpreted as containing either two or three strokes, hence the discrepancy in residual stroke count between the Spahn and Hadamitzky and the Halpern dictionaries.
- ² It is assumed the Rose-Innes (1977) and Nelson (Haig 1997) dictionaries will be comparable in speed to the Spahn and Hadamitzky and the Halpern dictionaries, but they were not tested.
- ³ http://st2.yes.ne.jp/~hasimoto/cgi_bin/winner.cgi. (Accessed on September 13, 2002). The Japanese word for 'character,' *moji*, can mean a roman letter, a *kana* syllable, or an individual *kanji* (character), depending on context. It is here assumed that *moji* refers to *kana* syllables.
- ⁴ <http://www.hkcd.com.hk/1999a/tqb/o528/newsfile/n10-9.htm>. (Accessed on September 13, 2002).
- ⁵ The SmartEar 4.0 Chinese Speech Recognition System. See <http://www.twinbridge.com/>. (Accessed on September 13, 2002).
- ⁶ In China, for example, there is an increasing reliance on *pinyin* in primary-school literacy development (Rohsenow 1996, 2001) and computer technology (Liu 1991; Mair 1991; Zhou 1991).
- ⁷ Special *Wubi Zixing* keyboards overlaid onto the QWERTY keyboards represent a partial solution.

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A HUMAN LINGUISTICS VIEW OF 'METAPHORICAL LANGUAGE'

DOUGLAS W. COLEMAN
University of Toledo

ATTEMPTS TO DEFINE metaphor have invariably done so by contrasting 'metaphorical language' with 'literal language'¹. Paired examples, such as (1)a and b, are frequently offered to illustrate the distinction.

- (1) a. Sally is a block of ice.
- b. That is a block of ice.

Example (1)a is originally from Searle 1979, quoted by Kwiatkowska 1997:117. Definitions of metaphor, when offered, resemble this one from Matthews (1997:224):

[A] figure of speech in which a word or expression normally used of one kind of object, action, etc. is extended to another.

What is a 'figure of speech'? If we turn to Matthews own definition of the same, we find (1997:128):

...any form of expression in which the normal use of language is manipulated, stretched, or altered for rhetorical effect.

Compare the above definitions with one offered by Crystal (1987:425):

A figurative expression in which one notion is described in terms usually associated with another.

Lakoff and Johnson (1980) recast a variant of a more or less traditional distinction (between the metaphorical and literal) slightly when bringing metaphor into their own framework. They see in metaphor elements of one semantic domain systematically providing the cognitive structure and means of expression carried over to another.

In all cases, however, the same basic issue remains. The key problem lies in determining what is 'normal' (or 'usual'). Note that we also see this term (or in Crystal, 'usually') in the definition of 'metaphor'. Clearly, in such contexts, 'normal' is not intended in a statistical sense, since no observational frequency counts are ever offered. The same can be said of Crystal's 'usually'. Thus, the conclusion that (1)a is 'metaphorical' and (1)b is 'literal' is based on the linguist's *prior* knowledge that (1)b in some *qualitative* sense represents a 'normal use of language' and (1)a, something

else. Unfortunately, this means that the distinction as presented above depends on the linguist's assuming essentially what he wants to prove.

The source of the problem is that expressions (whether metaphorical or literal), like other 'objects of language', do not exist in the physical domain. Saussure (1959, e.g. on p. 8) recognized this explicitly, but then avoided facing the issue. Some recent work by Lamb (1999, e.g. on pp. 14–15), Yngve (1996, e.g. on pp. 9–12), and others explicitly aims to face up to this question directly by focusing primarily on people (Lamb 1999: 7–8; Yngve 1996:112–18), which do exist in the physical domain.

1. TRYING TO MOVE MEANING INTO THE PHYSICAL DOMAIN. In *Language*, Bloomfield (1933:22–24) at first argues at length that 'meaning' should be considered only in terms of physical objects and events. In the famous example of Jack and Jill walking down a lane, Jill speaking, and Jack climbing a fence to get her an apple, he mentions these events, as well as a possible state of hunger being experienced by Jill. He also mentions Jill's 'past dealings with Jack' and other 'predisposing factors' (ibid: 23). He couches 'acts of speech' in terms of behaviorist stimulus-response ($S \rightarrow R$) theory, describing the ' \rightarrow ' as representing 'the sequence of events within one person's body—a sequence of events which we think is due to some property of the nervous system' (ibid: 26). He then defines 'meaning' explicitly in terms of 'practical events' both preceding and following the 'act of speech' (ibid: 27), presumably including those represented by the ' \rightarrow '.

Interestingly, much later (ibid: 75) in the same work Bloomfield (and not for the first time) proposes rejection of the relevance of internal physical states, or 'minute nervous processes'. He does not at this point mention all of the other physical-domain elements he has identified earlier. It is thus inconsistent that he uses the rejection of 'minute nervous processes' in effect as the foundation for rejection of all physical-domain elements. This is significant because it is through this broad rejection of the relevance of the physical domain that Bloomfield lapses into consideration of meaning solely in traditional philosophical terms—as involving the *reference* of a *sign*. This in turn leads him to reject the relevance of meaning altogether. Finally (ibid: 78), he contradicts this position via the introduction of his 'fundamental assumption of linguistics', i.e. 'in every speech-community some utterances are alike in form and *meaning*'.

Since Bloomfield's time, many have suggested ways to treat the 'minute nervous processes' relevant to communication. One very cogent attempt is found in Lamb (1999 *passim*). However, such attempts are based on a treatment of meaning incorporating a weakness complementary to that of Bloomfield's (1933:27) proposal, in that they focus on internal processes of the nervous system to the exclusion of external physical systems. This forces the linguist to maintain Bloomfield's unwarranted 'fundamental assumption'. The linguist hears a speaker on one occasion and then a different speaker on another. He assumes that he hears the same utterance (or does not) and assumes (or does not assume) the utterances to be synonymous.

2. ESTABLISHING SAMENESS OF LINKAGE PROPERTIES. How can such assumptions be avoided? Yngve (1996) points out that we can, by analyzing what Bloomfield called

'practical events', identify *linkages*, or types of communicative interactions (ibid: 126). At a given point in a linkage, we can treat meaning in two ways: first, in terms of how the state of the linkage changes and second, in terms of how the properties of communicating individuals change.

Consider a given linkage type; call it /bookstore checkout/². Suppose two instances of this type are the linkages /checkout 1/ and /checkout 2/. At a certain point in the linkage /checkout 1/, a communicating individual, /Sam/, in the participant role /customer/ produces an articulation <Yes>. In the linkage /checkout 2/, another communicating individual, /Tom/, in the same participant role—/customer/—at the same point in the linkage produces an articulation <OK>. Suppose that despite the two observably different articulations <Yes> and <OK>, we see otherwise similar events in the two external physical systems /checkout 1/ and /checkout 2/. In other words, <Yes> and <OK> may be associated with the same *prior* and *subsequent* changes in linkage properties in /checkout 1/ and /checkout 2/, respectively. In this way, we explicitly avoid having to treat *Yes* and *OK* as utterances which we identify and then interpret as synonymous solely on the basis on 'native-speaker intuitions'. From such observations, we might infer that at this point the participant role properties of the communicating individuals involved have changed in the same way in both instances of the linkage type. In doing so, we are drawing inferences about the internal properties of a person on the basis of that person's behavior within a larger physical system. Thus, if we consider people communicating in the real world, we can treat meaning both at the level of 'practical events' (linkages) and 'minute nervous processes' (internal properties of the people).

3. A LINKAGE DESCRIPTION. Some linkage types allow for relatively small variation, presenting ideal opportunities to consider meaning at both levels. One general category of such linkages is the television game show. The author has developed key elements of a linkage description for the syndicated television game show *Street Smarts*, based on an analysis of elements of twenty-five episodes. On this game show, three people have previously been recorded being quizzed on various topics in 'man on the street' style interviews. The on-stage contestants are told what the interviewees were asked and they then try to guess the correctness of the interviewees' responses. The contestants earn points for each correct guess.

The show has three primary participants, one in the role of /host/ and two in the role of /contestant/. There is a live audience with an unspecified number of participants. Their role is highly constrained. There are occasionally two female stage assistants, also with very limited (non-speaking) roles. Other people are present, and are (during taping, we presume) simultaneously involved in separate linkages, sometimes with those in the game linkage, e.g. especially with the /host/.

The setting is as follows. Each contestant sits in a chair on a raised platform at stage left (on the right from the point of view of the audience). Three screens at stage right display video clips of the interviewees and game-round signs. The /host/ stands in center stage.

Relevant props include /display screen 1/, /display screen 2/, /display screen 3/. There are also /note cards/ held by the /host/. During the <Who Knew It?> and <Who Blew It?> subtasks (rounds), each /contestant/ has a /selector/. The /selector/ (my term) is a long box with a three-sided roller inside and a window-like opening on the front. On each side of the roller is the name of one of the interviewees. On each end of the box is a handle allowing the /contestant/ to turn the roller so that a different interviewee name appears in the opening. During the <Pick Your Pony> and <Wager of Death> subtasks, each /contestant/ has a /RIGHT-WRONG paddle/. The /RIGHT-WRONG paddle/ is shaped liked an oversized ping-pong paddle. One side of the paddle is green, with a label resembling '**RIGHT**'; the other side is red, with a label resembling '**WRONG**'. Beside each /contestant/ is a /score display/, which shows his/her score in hundreds of points.

The linkage structure proceeds through general instructions from the host, introductions of the interviewees, four rounds of play ('Who Knew It?', 'Who Blew It?', 'Pick Your Pony', and 'Wager of Death'), and a short closing sequence. This overall structure is shown in (3), with a partial breakdown of the subtasks involved in the Task <show lead-in>. It is the Subtask <player goal> that is of interest in the current study.

- (3) Linkage /Street Smarts show/:
- Task <show lead-in> =
 - Subtask <introduction to game (voice-over)> →
 - Subtask <instructions to contestants> =
 - ... →
 - Subtask <player goal> →
 - ...;
 -
 - Subtask <introductions of contestants> →
 - Subtask <introductions of 'street scholars'>;
 -
 - Task <who knew it?> →
 - Task <who blew it?> →
 - Task <pick your pony> →
 - Task <wager of death> →
 - Task <show closing>.

In notation used in this paper, systems are identified in slash brackets, e.g. 'Linkage /Street Smarts show/', and properties (including task properties) are identified in pointed brackets, e.g. '<can give correct response>' / '<~ can give correct response>' (a conditional property) or 'Task <show closing>'. Also, '=' indicates the beginning of a definition of a task in terms of its component subtasks, '→' indicates sequential activation of subtasks, 'x' indicates simultaneous activation of subtasks, '+' indicates a set of alternative activations among subtasks, ';' indicates the end of a subtask definition, and '.' indicates the end of an overall task definition.

4. AVOIDING UNSUPPORTED ASSUMPTIONS IN ANALYZING THE LINKAGE. How can the junctures of the different tasks and subtasks be identified by the observer without falling prey to Bloomfield's fundamental assumption? There are in fact several ways. Rounds (the major linkage subtasks) are delineated by timing relative to the start of the show and commercial breaks, recorded sound effects, and conventional images on the display screens at stage right. For example, after the third commercial break, the following events are essentially invariant. A specific music sequence plays as the camera swings in from a long shot over the audience toward the stage. The /host/ begins to announce '...it's time for' and a recorded, digitally-altered voice booms, 'THE WAGER OF DEATH!'³. The display screens, visible since the return from the commercial break, have shown the faces and names of the three interviewees, but at this point three ominous-looking doors slam down over the display screens, bearing a label '**WAGER OF DEATH**'.

Much earlier, while giving his initial instructions, in the subtask <player goal>, the /host/ addresses the participants in the role of /contestant/ and performs an almost identical series of speech articulations each time. (Viewers perceive 'It's up to our players to determine...') The timing from an identical voice-over during the <introduction to game> subtask to this series of speech articulations is almost the same in each instance of the linkage. Perhaps less obvious are elements such as camera work, which is extremely similar from one instance of the linkage type to the next—specifically, at the point when the host says, 'It's up to our players to determine...', there is a change from a longer shot in which the /host/ is in the left edge of the frame and both participants in the role of /contestant/ are also visible to a tighter shot in which the host is centered, but not quite in close-up. All of these elements taken together allow us to identify linkage states without making Bloomfield's unsupported 'fundamental assumption'.

5. THE CURRENT EXAMPLE OF SYNONYMY. At this point, a high degree of variation can be observed in the speech behavior of the /host/. He tells the two participants in the role of /contestant/ they must determine *who's got it goin' on and who's a few stripes short of a zebra, ...a few celery sticks short of a veggie platter, ...a chicken short of a henhouse*, etc. A partial list of examples is shown in Appendix A. (There, '#' is a show identification number found in the closing credits, and the 'c' and four digits following refers to the copyright date also found there. In some cases, poor recording made the identification number and/or copyright date unreadable. The contestant names, however, provide an unambiguous identification for each show in all cases included in this study.)

In each linkage of this type, any variant among those found in Appendix A changes the linkage properties in exactly the same way. While the participants in the role of /contestant/ may have their properties as communicating individuals uniquely affected by a given variant, his/her role part properties (i.e. /contestant/) are affected in the same way each time, since observable behavior within the linkage is consistent from case to case.

6. A PROPOSAL FOR TREATING 'METAPHORICAL LANGUAGE'. The following is still somewhat speculative, and is based in part on prior work in the relational network approach of Lamb (1999) and others. In each example cited, the /host/ attributes a two-valued conditional property (Yngve, 1996:140–43) to each of the interviewees (more properly, to each clip showing an interviewee's response), i.e.,

- (4) /interviewee/:
 <can give correct response> / < ~ can give correct response>

An example is given in (5), from the show in which the /host/ addresses communicating individuals /Rhett/ and /April/, both of whom are in the participant role of /contestant/. The host says, 'It is up to our players to determine...'

- (5) ...who's got it goin' on **and** who's a few legs short of a centipede.

The /host/ begins his attribution of an interviewee property with *who's got it goin' on* (Subtask <who's> → Subtask <got it goin' on>). He ends it by establishing a contrast in possible values of this property (Subtask <who's> → Subtask <a few legs short of a centipede>).

I here take it for granted that a human linguistics approach to idioms based by analogy on the classic treatment of Makkai (1972) is possible, permitting a description of the synonymy of, e.g. *who's got it goin' on* and *who's got their head(s) on straight* in terms of the task properties of a communicating individual. A treatment of the task properties of the communicating individual based by analogy on Makkai's treatment of semotactic and lexotactic aspects of a stratificational grammar would allow us to clearly describe the common set of higher-level task properties activated in the communicating individual regardless of whether the lower-level subtask were Subtask <who's got it goin' on>, Subtask <who's got their head on straight>, etc. For convenience, I will label this higher-level task property as Subtask <have knowledge (of the synonymy)>.

In the second part of all the cited examples there is a common expression of 'incompleteness' (*who's a few ___ short of ___, who's an ___ short of ___, who doesn't have all the ___, etc.*). At this point, the /host/ provides the identification of the other potential value of the property being attributed to interviewees.

With regard to the participant role properties of the /contestant/, only the attribution of the two-valued conditional property is relevant. However, other general properties of the communicating individuals (/Rhett/ and /April/ vs. /Christopher/ and /Ayiesha/) may be variously affected by specific differences in the speech behavior of the /host/ (e.g. *who's got it goin' on* and *who's a few legs short of a centipede* vs. *who's got their head on straight* and *who's an anchovy short of a Caesar salad*).

7. RELEVANT HIGHER TASK PROPERTIES OF THE /contestant/ ROLE PART. In hearing the stretch of speech involved in each case above, the lower task properties relevant to

the /contestant/ role (e.g. the Task <got it goin' on> property) would activate only the higher-task properties shown in (6).

- (6) /contestant/:
- Task <contrastive attribute> =
 - Subtask <identify person> x
 - Subtask <have / lack> x
 - Subtask <knowledge>.

All other lower task properties activated during this portion of the /host/ speech event would affect only general properties of the person who is in the role of /contestant/ as a communicating individual. Thus a person in the role of /contestant/ has certain subjective experiences associated with knowledge of 'henhouses', 'anchovies', 'centipedes', and so on, depending on the specific speech behavior of the /host/. However, none of these subjective experiences correlates with changes in their properties specific to the role of /contestant/.

8. CONCLUDING REMARKS. The above suggests a way to deal with so-called 'metaphorical language' in physical-domain terms. I propose that what we conventionally call 'metaphorical language' involves communicative behavior that causes changes in linkage properties and role part properties based only on small subsets of the task properties in the listener. The majority of the task properties involved affect the general properties of the listener as a communicating individual, but do not affect his/her properties as a participant in a specific linkage.

What I am suggesting is quite different from a conventional view of metaphor, i.e. one in which features and relations are carried over from one semantic field to another. First, my treatment is couched in terms of the physical domain. It does not depend on so-called 'data' which is actually the author's own 'native-speaker intuition', but on external observation. It does not refer to logical-domain elements, such as 'semantic features'. Rather, it concerns physical systems (e.g. linkages and communicating individuals) and their properties (e.g. conditional properties and task properties). Finally, it is not simply an analogy of the traditional approach. In the approach I propose, nothing is 'carried over' or 'transferred' from one place to another. I suggest that what we call 'metaphor' is simply a specific class of events which occur when some properties of the communicating individual are affected by input in a speech channel, but then have no effect on the properties relevant to that individual's participant role in the linkage in which he/she is actively engaged.

Further studies involving additional linkage types will, of course, be needed to (dis)confirm the proposal presented here, and to clearly differentiate 'metaphor' from other potential cases in which similar property changes occur in communicating individuals.

- ¹ The following is by no means intended to be an exhaustive overview, but is meant only as a general characterization.
- ² Here and elsewhere, descriptive labels are used simply for the convenience of the author and his readers. They no more indicate my 'intuitive knowledge' of the thing being described than does, for example, a physicist's use of terms like 'positive charge' or 'mass' to refer to properties of particles. They are not intended to bias the reader. The only alternative that suggests itself would be to use 'neutral' labels such as '/X/' and '/Y/' instead of labels like '/host/' and '/contestant/'. Such a practice might or might not reduce bias. It would certainly increase reader confusion.
- ³ Although I have, for reader convenience, labelled these scripted speech events in conventional form, I have not identified them as certain 'utterances' via my 'native-speaker intuition'. (To do so would be to accept Bloomfield's unwarranted fundamental assumption.) Instead I have identified linkage states on the basis of the various physical-domain events described here.

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APPENDIX A

- Polly & Michael (#1151 c2001): who's got their head on straight and who doesn't have all their dots on their dice
- Stephanie & Alex (#1073 c2000): who's got their heads on straight and who's a few ice cubes short of an igloo
- Alisha & Mike (#/c unreadable): who's got it goin' on and who's a few wontons short of a poo-poo platter

- Tyra & Corey (#/c unreadable): who's got it goin' on and who's a few grunts short of a caveman
- Scott & Sioekie (#1032 c2000): who's got it goin' on and who's a few stripes short of a zebra
- Michelle & Jeremy (#1035 c2001): who's got it goin' on and who's a few celery sticks short of a veggie platter
- JJ & Mark (#1174 c2001): who's got it goin' on and who's a few flowers short of a bouquet
- Christopher & Ayiesha (#1087 c 2000): who's got their head on straight and who's an anchovy short of a Caesar salad
- Michelle & Brandon (#1125 c2001): who's got it goin' on and who's a chicken short of a henhouse
- Rhett & April (#1131 c2001): who's got it goin' on and who's a few legs short of a centipede
- Christian & Aimee (#/c unreadable): who's got it goin' on and who's a few miles short of a marathon
- Michelle & Emiliano (#1013 c2000): who's got it goin' on and who's a few pieces short of a puzzle
- Kathi & Jason (#1135 c2000): who's got it goin' on and who's a few quills short of a porcupine
- Ivy & Terry (#1107 c2000): who's got it goin' on and who's a few sheep short of a herd
- Aaron & Courtney (#1100 c2000): who's got it goin' on and who's a few bites short... bits short of a byte... I'm not a computer guy
- Jason & Ra'nica (#1074 c2001): who's got their head on straight and who's a few beats short of a pulse
- Sarah & Ed (#1045 c2001): who rocks and who's a few strings short of a guitar
- Theo & Laurie (#/c unreadable): who's got it goin' on and who's a few monks short of a monastery
- Johnny & Krista (#/c unreadable): who's got it goin' on and who's a few fries short of a Happy Meal
- Nathan & Denese (#/c unreadable): who's got it goin' on and who's a few fries short of a Happy Meal [Note: The above are one of the only two identical pairs observed.]
- Angie & Gibran (#1063 c2000): who's got it goin' on and who's a few spots short of a Dalmatian
- Allison & Rocky (#1091 c2000): who's got it goin' on and who's a few beers short of a bash
- Sarah & Neal (#1077 c2000): who's got it goin' on and who's a few pastramis short of a delicatessen
- Bylle & Roman (#1097 c2000): who's got it goin' on and who's a few stars short of a constellation
- Kimberly & Chris (#/c unknown [partial, short tape]): who's got their head on straight and who's a few fish short of a fish fry

LETTERS, NUMBERS, AND THE DATING OF OGAM

TOBY D. GRIFFEN

Southern Illinois University Edwardsville

THERE ARE TWO main functions of symbolic graphic representation. On the one hand, there is the representation of language in ideographic, logographic, and phonographic systems of writing with which linguists are quite familiar (for example, Sampson 1985). On the other hand, there is the numerical representation of mathematics with its own historical and psychological development (see Ifrah 2000).

Little attention has been given to the manner in which the linguistic systems interact with the numerical. Yet, insights into this interaction may well be necessary for an understanding of the development not only of the ogam signary, but also of the Greek alphabetic number system; for, as we shall see, the two graphic systems can indeed be quite interrelated.

1. THE ORIGIN OF WRITING. In the past half century, there has been much progress in uncovering the development of writing. In the foundation work of Gelb (1952) the traditional view (see Pope 1999) that ideographs led to logographs and on to syllabaries and that all full alphabets were derived from the Greek innovation to the Phoenician syllabary or consonantal alphabet was solidified in the framework of modern linguistics. In the next decade, Amiet (1968) provided a crucial insight into the origin of writing itself:

Writing was invented by accountants faced with the task of noting economic transactions which, in the rapidly developing Sumerian society, had become too numerous and too complex to be merely entrusted to memory. Writing bears witness to a radical transformation of the traditional way of life, in a novel social and political environment already heralded by the great constructions of the preceding era. (Translated and quoted by Ifrah 2000:80)

On the archaeological side of linguistic research, Schmandt-Besserat (1992, 1996) provided crucial corroboration for Amiet's views. Accounting tokens were found in ancient sites in Sumer. These tokens had been gathered together into clay pouches, or *bullae*, to maintain a collective record. Later, images of the tokens were inscribed on the *bullae*, so that the *bullae* would not have to be broken open to determine the contents. From here, it was a short step to dispensing with the *bullae* altogether and relying solely upon a graphic recording.

While she believes that she has direct evidence for the development of the linguistic graphic representation from the numerical, Schmandt-Besserat's findings in this area have been debated (see, for example, Lieberman 1980). Nevertheless, as Sampson

≡	N	/n/	≡	Q	/k ^w /	≡	R	/r/	≡	I	/i/
≡	S	/s/	≡	C	/k/	≡	Z	/t ^s /	≡	E	/e/
≡	F	/w/	≡	T	/t/	≡	GG	/g ^w /	≡	U	/u/
≡	L	/l/	≡	D	/d/	≡	G	/g/	≡	O	/o/
≡	B	/b/	≡	H	/h/	≡	M	/m/	≡	A	/a/

Table 1. The ogam alphabetic signary.

(1985:61) points out, ‘...when a simple accounting system using number-graphs impressed on clay tablets had been created, it would... have been natural to begin supplementing the indications of number with pictures of the items numbered’.

In Herrick 2002, it is pointed out that Plato and many of his Greek contemporaries saw writing as a desirable utilitarian exercise for such matters as business records and accounting, but as an undesirable distortion of ideas on a more philosophical plane. On the other side of Europe, the Celts as well had no objection to writing for practical economic purposes, but the Druids forbade the use of writing in matters of learning (see, for example, Ellis 1994:55). Indeed, symbols of an apparently ritual nature existed in Neolithic southeastern Europe but apparently failed to develop into a full-scale writing system (Winn 1981:253–57).

2. THE DEVELOPMENT OF THE OGAM SIGNARY. While the oldest extant evidence of ogam is found on stone monuments in the British Isles dating from about the fourth century of the Common Era, the writing system itself was used for an as-yet undetermined length of time on wood, which has long since decayed. Ogam was written from the bottom to the top along the edge of the stone monument or across a centerline, yielding the traditional rendition of the alphabetic signary in Table 1.

As demonstrated Griffen in 2002, the sign ≡ traditionally rendered as H in descriptions of the signary, was actually derived from *P /p/. This was shown through the phonetic structure of the signary’s array as well as through comparative evidence from Irish and Pictish ogam.

As can be seen in Table 1, the ogam signary was quite transparently developed from a tally system (see especially Gerschel 1962 for detailed exposition). If it was an independent development, ogam writing may have represented the immediate leap from number system to alphabet without going through the stages of ideograph, logograph, and syllabary; although, to be sure, such stages recorded on wood would not be extant.

On the other hand, there is evidence of a much later alphabetic interaction involving ogam. This interaction provides us not only with important information on the dating of ogam, but—in a more theoretical vein—also with significant insights into the typology of interaction between number and letter systems.

A	1	I	9	P	17
B	2	K	10	Σ	18
Γ	3	Λ	11	T	19
Δ	4	M	12	Υ	20
E	5	N	13	Φ	21
Z	6	Ξ	14	X	22
H	7	O	15	Ψ	23
Θ	8	Π	16	Ω	24

Table 2. *Earlier Greek alphabetic number system.*

3. FROM LETTER TO NUMBER TO LETTER. In searching for the origin of ogam, we should note that ancient European number systems generally developed independently of writing systems. For example, Mycenaean Linear B maintained the number system originally developed for Minoan Linear A, in spite of a major change in language and linguistic adjustments to the syllabary (Ifrah 2000:178–79).

It has often been suggested that ogam was most directly influenced by Latin, but the typology is all wrong. The Roman number system, which developed from the Etruscan, originally bore no resemblance to the writing system. Each unit was represented by a vertical line resembling a finger, five by the shape of an outstretched hand, and ten by the combination of two hands (palm-to-palm). It was not until later that the unit was represented iconically by the letter I, five by the letter V, and ten by the letter X. As seen in the representation of larger numbers, even the C for *centum* ‘hundred’ and the M for *mille* ‘thousand’ developed from vertical and curved lines having nothing originally to do with the letters of the alphabet (see Ifrah 2000:191–200).

It is in Greek that we find the proper typology. The original Greek number system was acrophonic. While units consisted of the usual vertical line, five was represented by the Greek letter π or *pi*, the first letter of *pente* ‘five’; ten by the δ or *delta* of *deka* ‘ten’; 100 by the η or *eta* of *hekatón*; 1,000 by the χ or *chi* of *chilioi*; and 10,000 by the μ or *mu* of *murioi* (Ifrah 2000:182). This system may bear some similarity to ogam, but it is by no means as well developed.

Beginning in the sixth century BCE, however, the Greeks further refined their acrophonic system into an alphabetic number system that matched letter to number from *alpha*/1 to *omega*/24, as in Table 2.

As noted by Ifrah (2000:214),

The tablets of Heliastes, like the twenty-four songs of the *Iliad* and the *Odyssey*, used this kind of numbering, which is also found on funerary inscriptions of the Lower Period. However, what we have here is really only a simple substitution of letters for numbers, not a proper alphabetic number-system which... calls for a much more elaborate structure.

A	1	I	10	P	100
B	2	K	20	Σ	200
Γ	3	Λ	30	T	300
Δ	4	M	40	Υ	400
E	5	N	50	Φ	500
F	6	Ξ	60	X	600
Z	7	O	70	Ψ	700
H	8	Π	80	Ω	800
Θ	9	ρ	90	Ϡ	900

Table 3. Later Greek alphabetic number system.

𐀀 N /n/	𐀁 Q /k ^w /	𐀂 R /r/	𐀃 I /i/	𐀄
𐀅 S /s/	𐀆 C /k/	𐀇 Z /t ^s /	𐀈 E /e/	𐀉
𐀊 F /w/	𐀋 T /t/	𐀌 GG /g ^w /	𐀍 U /u/	𐀎
𐀏 L /l/	𐀐 D /d/	𐀑 G /g/	𐀒 O /o/	𐀓
𐀔 B /b/	𐀕 H /h/	𐀖 M /m/	𐀗 A /a/	𐀘

Table 4. Later ogam alphabetic signary with forfedā.

This more elaborate structure—a ‘proper alphabetic number-system’—was introduced around the final quarter of the third century BCE and is represented in Table 3.

The system was additive, in that a number such as 333 could be rendered as TAT or τλγ. For yet larger numbers, there were more elaborate combinations, based upon the additive principle enhanced by multiplication. It is noteworthy that in order to adapt the alphabetic system to a number system, the Greeks resurrected three obsolete letters—Ϝ *digamma*, Ϙ *koppa*, and Ϡ *san*. Moreover, these three additions allowed a balanced array of letters representing numbers.

Here, then, we have indeed found our typological match. The precise letter-*per*-number correspondence found in the ogam signary is matched by the number-*per*-letter system of Greek. But which system was matched—the earlier twenty-four alphabetic number system or the later more elaborate system?

If in fact this were to provide evidence for the influence of Greek on ogam, then the model used could possibly be determined by the additions both to the Greek number system and to the ogam alphabetic system. Parallel to the later Greek developments, ogam added five additional letters—the *forfedā*, as shown in Table 4.

These additional letters were assigned various alphabetic values, and Gerschel 1962 suggests numerical values as well. Furthermore, as Macalister has pointed out (1937: 22–24, see also Sims-Williams 1992), the form of the additional ogam signs betrays an influence from the Greek alphabet. Finally, it should be noted that the addition of the *forfedā* was accomplished in such a way as to maintain the balanced array of numbers representing letters—precisely parallel, though inverse to the development in Greek.

The *forfeda*, however, were not a result of the expansion of the Greek number system, for the additional ogam letters actually did not appear until the second half of the first millennium CE. Nonetheless, the parallel development does verify the fact that ogam and Greek did share precisely the same typology, undergoing precisely the same developments. If we choose to travel the traditional orientalist route then, we might suppose that the ogam signary represented in Table 1 was developed under the influence of the earlier Greek alphabetic number system shown in Table 2. This would provide us with a credible range of dating for the development of the ogam signary—between the sixth century and the third BCE.

4. THE REALITY OF THE OGAM/GREEK RELATIONSHIP. Of course, the precise, though inverse parallels between the development of the Greek number-*per*-letter system and the corresponding ogam letter-*per*-number system provide the sixth-century date only if Greek influenced ogam. In a nontraditionalist and nonorientalist hypothesis though, the ogam may be seen to have influenced the Greek.

Indo-European /p/ changed through /χ/ to null in Celtic, yielding such correspondences as the Latin root *nepot*- ‘nephew, grandson’ to Pictish ogam NEHT- and to Irish ogam NET- (Griffen 2002). This process had to have been completed before most Celtic dialects changed /kʷ/ to /p/, leading to such correspondences as Latin *quinque* ‘five’ and q-Celtic Irish *cóic* to p-Celtic Welsh *pym*. If the first change had not been completed first, Welsh *pym* would ultimately have been realized as **yn*.

Now, for Greek to have been influenced by ogam, it would not have mattered what sound changes had occurred in Celtic subsequent to the development of the system—*P could well have already changed to H. For the ogam to have been influenced by the Greek, on the other hand, the Celtic *P would have to have been in place in the sixth century, in order to participate in the original signary.

As it were, the Celtic or Celtic-influenced dialects of Lepontic and Ligurian around the Gallo-Italic Alps had already completed the second shift by the beginning of the seventh century BCE at the latest (Lejeune 1971:68–69, see also Whatmough 1970:77–80). Indeed, such evidence could draw the ogam signary well back into the second millennium BCE (Whatmough 1970:80).

While we may be partial to explaining relationships between Greek and the ‘barbarian’ languages of northern Europe as springing from Greek innovations, the linguistic evidence points to the opposite in this case. Given the close typological similarity between the Greek and the Celtic systems and the absence of any other non-Hellenistic examples of this typology in the region (and it should be noted that the Hebrew developed from the Greek—Ifrah 2000:239), the influence of one upon the other is quite likely. Given the actual linguistic evidence, however, the influence would have to have proceeded from the Celtic to the Greek, perhaps by way of some intervening Indo-European or Old-European practice.

5. CONCLUSION. This conclusion is doubtless uncomfortable for many, if not most traditional linguists, for the old maxim *ex oriente lux* is still very much with us, in

spite of the mounting evidence against it. Indeed, Newgrange and Stonehenge were constructed before the Pyramids (compare, for example, Burl 2000:14–15), and there is evidence that the Old Europeans were using some form of symbolic prewriting (Winn 1981, Gimbutas 1991, Harrmann 1989) even earlier than those in the Near East. Nonetheless, the concept that the direction of influence should have been from northwest to southeast may still strike us as disconcerting.

Be this as it may, the historical evidence appears to bear out the connection. The early development of the Greek alphabetic numbers occurred at precisely the time of the founding of the Greek colony at Massilia (Marseilles), which opened up trade to Western Celtic areas from near the mouth of the Rhône (Cunliffe 1997:48–51).

From a linguistic perspective, moreover, we should recall Pope's observation on the development of writing systems—that they 'have all been close copies of the most prestigious script of their time and place... with adaptations of detail to suit the requirements of the new language, but with no innovations of principle' (Pope 1999:181). In accordance with Ockham's razor, it is quite possible that ogam may have taken the step from a more expected syllabary or consonantal alphabet to a full alphabet through contact with the Greeks (although, of course, we have no way of confirming this). On the other hand, the development uncovered here of Greek alphabetic numbers from the ogam would indeed have been a mere 'adaptation of detail' from the ogam system of numerical letters to the primitive Greek system of acrophonic numbers.

For linguists, the interaction between the graphic representation of numbers and that of letters or other linguistic signs should provide insights into the way graphic representations may interact. It is not enough to examine the linguistic independently of the numerical, for in the development of writing and in actual practice, the two systems are seen here to be intricately and inextricably bound together.

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THE HOLY QUR'ANS: A CORPUS COMPARISON OF THREE ENGLISH VERSIONS

CAROLYN G. HARTNETT
College of the Mainland

THIS PAPER COMPARES THREE English translations of the Muslim scripture, the Holy Qur'an, using corpus linguistic tools to reveal how the translations differ systematically in ways that relate to the stated goals of the translators.

The introductions to various versions of the Qur'an conflict with one another. Differences among Qur'anic scholars range from details of how it was composed to what it says regarding specific topics, such as the meaning of *Islam*. For example, one of the translators in this comparison, Irving, disagrees with those who 'decreed that the word *Islam* means "submission"'. He prefers *commitment* as more positive, active, and responsible than *surrender* or *submission*, as reported in Table 1 and discussed later. Devout Muslims read the entire Qur'an every year during the month of Ramadan; therefore they may be more influenced by the contents of their Book than people who seldom if ever read their entire Bible and depend on weekly interpretations of selected passages.

To discover what the original Qur'an says, a non-Muslim ignorant of Arabic would have to choose a translation without knowing which translation is most accurate. A linguist, however, can compare versions objectively with corpus analysis tools such as WordSmith, which is used in this study. Although WordSmith tools cannot judge accuracy or adequacy, they can provide objective data to suggest and substantiate hypotheses about the topics discussed. Content presented by all the interpreters from different cultures probably exists either in the original or in something common to the interpreters, such as a later date or the perspective of the English language. Differences could result from later instruction and laws or from the interpreters' cultures, purposes, intended audience, and views on translation. They explain these in their introductions.

Whenever possible, I attempt to relate the differences reported by WordSmith to the cultures of the translators and what they say in their introductions. I have not read any of these versions beyond the introductions. I shall describe the WordSmith tools, the three versions, the basic similarities, and the significant differences in the vocabulary used on the central topic of the Islamic religion. I shall try to relate the findings to the stated purposes, audience, and context of each version.

1. HOW WORDSMITH WORKS. WordSmith software begins analyzing a text corpus by compiling a WordList that includes the frequency of each word and its percentage in the entire text, which allows comparison of texts of different lengths (Scott 1997). WordLists are arranged alphabetically and by frequency. Most of the words at the top of a frequency list are short function words—prepositions, articles, conjunctions,

	Irving			Arberry			Ali		
	Instances	%		Instances	%		Instances	%	
DEITY									
God	2870	1.97		2940	1.96		84	0.05	~
Allah	0			0			3054	1.74	*
Merciful	125	0.08	~	322	0.21	*	286	0.16	
Compassionate	5			231	0.15	*	5		
Mighty	3			185	0.13	*	31	0.02	
Name	52	0.03		160	0.11	*	63	0.04	
DEITY TOTAL	3055	2.08		3838	2.56	*	3523	2.01	
PRACTICE									
Messenger	340	0.23		335	0.22		203	0.11	~
Message	22	0.01		31	0.02		120	0.07	*
apostles	0			5			190	0.11	*
praise	66	0.04		49	0.03		109	0.07	*
serve	193	0.11		271	0.18	*	173	0.10	
worship	138	0.09		14	0.01	~	173	0.10	
dominion	0			3			35	0.02	*
recite	61	0.04		78	0.05		20	0.01	~
read	56	0.04	*	4			21	0.01	
5 OTHER KEYWORDS	3		~	168	0.11		166	0.10	
PRACTICE TOTAL	879	0.56	~	958	0.62		1210	0.70	*
BELIEF AND ISLAM									
faith	47	0.03		51	0.03		270	0.16	*
belief	780	0.52		744	0.51		661	0.38	~
disbelief	474	0.31	*	147	0.08		6		~
unbelief	0		~	325	0.22	*	199	0.11	
pagan	8			4			24	0.01	*
idolator	12	0.01		69	0.05	*	13	0.01	
commitment	83	0.06	*	35	0.02		18	0.01	
submission	9	0.01		12	0.01		31	0.02	*
surrender	5			59	0.04	*	1		
BELIEF & ISLAM TOTAL	1418	0.94		1446	0.96		1223	0.70	~
WRONGDOING									
bad	55	0.04	*	1			8		
wrong	228	0.16		92	0.06	~	243	0.13	
kill	81	0.05	*	8	0.01		15	0.01	
torment	305	0.20	*	2			5		
chastisement	0		~	375	0.25	*	9	0.01	
evil	144	0.09	~	391	0.26	*	272	0.16	
lies	153	0.10		242	0.16	*	83	0.05	~
reject	139	0.09		9	0.01	~	330	0.19	*
sin	33	0.02	~	64	0.04		152	0.09	*
8 OTHER KEYWORDS	171	0.10		233	0.17	*	169	0.09	
WRONGDOING TOTAL	1309	0.85		1417	0.96	*	1286	0.73	~

Table 1. Islamic Religion

and pronouns—whose frequency often relates to style more than content. Others are vague words like *any, back, day, people, take*. Some of these are not very meaningful in themselves, but the more specific words contribute to cohesion and indicate the content (Halliday & Hasan 1976).

Comparing WordLists yields different information. The KeyWords tool does this. It calculates statistics and reports words with significant differences in frequency in two WordLists. WordSmith's KeyWords are distinctive. They are not usually the most common words, but the ones that vary the most in frequency. Another WordSmith tool, Concord, can explore the distinctions by displaying a searched word in context and tabulating frequencies with specified collocates. For example, *know* (by deity or human) is among the 200 most frequent words in all three versions. It is also a Key-Word because one of the texts examined uses it almost twice as often as another (as tabulated in Table 2). The third text uses it with middle frequency but adds a wide variety of inflectional endings, including archaic *-eth*. Lemmatizing and rounding percentages change the exact degree of Keyness slightly, but the goal in this study is overall patterns, not syntactic analysis.

This study focuses on KeyWords, but a meaningful application of WordSmith's objective findings requires attention to synonyms, near-synonyms, antonyms, negatives, negation without negatives, metaphorical language, and other wording that is difficult to identify or quantify. When it is necessary to compare a KeyWord with a word that is not Key, I note that status. Specialized usage in local dialects is assumed to be rare because these versions are intended for a wide audience. The percentages printed on the tables are more comparable than raw frequencies, because the Qur'an versions differ in length. To simplify reading of the tables, I mark notably high percentages with an asterisk, and notably low ones with a tilde.

2. THE THREE VERSIONS. The translators all recognize that their work is not authentic, only an interpretation or commentary. Each has explicated in an introduction his culture, purposes, some specific beliefs, and the nature of the intended audience.

One version downloaded from the Islamic website is by Dr. T. B. Irving. He is a Canadian who focuses on the needs of North Americans, both Muslims and non-Muslims, especially children who know no Arabic (1985). Irving wants Westerners 'to understand the ethical system which prevails in the Islamic world.' He says he writes 'in reverent yet contemporary English. My purpose is not to enter into theological controversy,' although he does do that several times. He insists, 'We must be able to discuss Islam on our own terms, terms which have been made up through our own knowledge and our own use of the English language... I have tried... to find the simplest word...'

For comparison, a linguist at the Islamic Azad University in Tehran, Hajar Khan-mohammad, provided me with a beautiful dual language edition that is used and taught there. She describes it as 'most eloquent and efficient.' It is by Arthur J. Arberry, based on earlier work but printed in Iran in 1995. Arberry is a non-Muslim who translated many classic Arabic texts and published books on Islamic civilization in the

1950's in London and New York. Arberry uses poetic devices to 'echo... however faintly the sublime rhetoric of the Arabic Qur'an.' Some of his vocabulary is difficult.

The Islamic website offered also a 1934 version by Abdullah Yusuf Ali. It (or its revision) is very popular in India today, according to a linguist there. Ali learned Arabic as a child and considers himself 'an Eastern mortal who has explored Western lands, manners, thought, and learning to an unusually great extent.' He tries to reflect 'the rhythm, music, and exalted tone of the original' in a form that 'every Muslim, man, woman, or child' can read and understand. His version is 16–17% longer than others.

3. ISLAMIC RELIGION. The lexical words most frequent in all versions reflect the content. I manually compared unlemmatized lists of the 200 most frequent words of each version. Although most of them are function words, 28 lexical words appeared on all three lists: *believe, believers, Book, created, day, deeds, earth, evil, fire, follow, given, good, hearts, know, knowledge, Lord, man, men, Merciful, Mercy, messenger, Moses, night, people, sent, signs, truth, turn*. As is appropriate, the commonalities in the Top 200 relate more to religion than to women or warfare, topics that are analyzed elsewhere (Hartnett, forthcoming b, c).

These top 200 words express the essential content of the Qur'an to the extent that all three translators agree on choosing them, although they may disagree on the interpretation. However, high frequencies do not tell the whole story. A single near-synonym can make a significant difference in this investigation. To examine contrasts, WordSmith tabulates lists of KeyWords, which vary significantly in frequency. WordSmith found 537 unlemmatized KeyWords in the three versions of the Qur'an. An example that distinguishes the Top 200 from KeyWords is *Lord*; it is one of the 200 terms most frequent in all versions, but it is not Key because all use it with similar frequency, .55–.60%. On the other hand, *God* is among the Top 200 of only two versions but is a KeyWord because Ali usually prefers *Allah*. Technically, *Allah* is not Key because there is nothing in the other versions to compare it with. Tabulations of KeyWords on this topic appear in Table 1.

3.1 DIFFERENCES. Why does Ali choose *Allah*? The percentage of Muslim population seems relevant. Ali lives farthest East and wants to maintain his Eastern identity. His choice of *Allah* from the Arabic words meaning 'the God' (AHD 2000) distinguishes Islam from the majority religion in India. Muslims are a strong 11% minority concentrated in certain locations. In contrast, in Iran the overwhelming predominance of Muslims can accept and value a version by the eloquent, scholarly non-Muslim Arberry. In Iran and India, different sects predominate and may prefer different translations, but the introductions do not discuss sects. In North America, Irving does not need to compete with Hindu deities; he chooses the term familiar to Christians for a version to be read by them as well as Muslims. (Canada is estimated only about 1% Muslim and the United States near 1.5%, similar to the percentage of Presbyterians.)

The non-Muslim Arberry leads somewhat on words describing deity, reflecting both his rhetorical aims and perhaps his conscientious need to explain fully. He leads espe-

cially with *Merciful*, the most common adjective in all versions, as reported in Table 1. His eloquence also includes describing the deity as *Compassionate* and *Mighty*.

Ali does not need to name or describe deity or Islam as often as the others do because he and his readers are already committed in the strong Muslim minority culture. Instead, he focuses somewhat more on the practice of Islam. His mentions of *Message* are triple Arberry's and Irving's, but mentions of *Messenger* only half. He leads on *apostles* and *praise*, but lags on *serving*. Further differences concern near-synonyms. Ali uses *faith* more than *belief*, but his total equals Arberry's and Irving's, though they prefer *belief*. However, Ali's *disbelief* and *unbelief* total only a third of Arberry's combination and Irving's single choice, *disbelief*, because Ali does not focus on what his committed audience already understands.

Irving slights the five grouped KeyWords that Ali and Arberry use: *Qur'an*, *prostrate*, *alms*, *compact*, and *dominion*. He explains his vehement insistence on *commitment* as the meaning of *Islam* (mentioned earlier): 'One who has surrendered or committed himself to the Deity... lives at peace.' The translations of the etymological roots of *Islam* include *submission*, *surrender*, *resign*, *peace*, and *complete*, but he objects to words with negative connotations in his own culture (AHD 2000). All three terms are more frequent in the Qur'an than in the British National Corpus (BNC) of 100 million current words, which parallel Irving's proportions: *commitment* at .014%, *submission* at .006%, and *surrender* at .001% (Leech et al. 2001). Irving's contemporary Western non-rhetorical and non-academic culture resembles the BNC's culture more than Arberry's or Ali's does.

3.2. READING. *Reading* and *reciting* the Qur'an aloud are important practices of Islam today, although often the original Arabic words were telling Muhammad what to report. Combining these is appropriate because the name *Qur'an* or *Koran* comes from an Arabic word meaning 'to read or recite' (AHD 2000). The combined frequencies of *read* and *recite* correlate very roughly with the literacy rates of the audiences: .08% total for Canada's 96.6% literacy rate, .05% for Iran's 65.2% literacy, and .02% frequency for India's 52% (*Compton's Interactive Encyclopedia* 2000).

Literacy is one of the values of modern western culture, including its affluence. Literacy rates reflect their cultures. Table 2 (overleaf) shows that Ali uses the most KeyWords expressing reasoning. He seems to substitute these for western literacy. India has a great emphasis on science; much of *A Brief Illustrated Guide to Understanding Islam*, printed in India, is devoted to science (44%, 29 of 66 pages, Ibrahim 1997).

Despite Ali's overall lead on reasoning, including *cause*, *understand*, and *judge*, it must be noted that *however*, *reason*, *argue*, *because*, and *explain* appear two or three times more often in Irving, who has only a middle total for reasoning. Both *however* and *reason* have the rare characteristic of occurring more frequently in the BNC than in any of the versions of the Qur'an (Leech et al. 2001). This is another instance where Irving's choices are closest to the BNC. They are both part of current Western culture. Arberry substitutes the highest frequency of *know*, which is not *reason*.

	Irving			Arberry			Ali		
	Instances	%		Instances	%		Instances	%	
REASONING									
cause	42	0.03		34	0.02		148	0.08	*
understand	15	0.01	~	67	0.04		130	0.08	*
judge	14	0.01	~	77	0.05		193	0.11	*
however	50	0.03	*	1			1		
reason	53	0.03	*	3		~	24	0.01	
argue	47	0.03	*	11	0.01		13	0.01	
because	192	0.13	*	63	0.04		114	0.07	
explain	96	0.06	*	2		~	46	0.03	
thus	138	0.09		6		~	155	0.09	
therefore	4		~	64	0.04		67	0.04	
dispute	3		~	57	0.04		66	0.04	
SUBTOTAL	654	0.42		385	0.24	~	957	0.56	*
know	435	0.29	~	711	0.47	*	641	0.37	
TOTALS	1089	0.71		1096	0.71		1598	0.93	*

OUTRIGHT NEGATIVES									
naught	0			63	0.04	*	13	0.01	
nay	0		~	98	0.07		122	0.07	
neither	54	0.04		165	0.11	*	45	0.03	
never	218	0.14	*	117	0.08		148	0.08	
none	7		~	78	0.05		107	0.06	
not	1680	1.11		1894	1.27	*	1568	0.89	~
nor	393	0.26		129	0.09	~	403	0.23	
SUBTOTAL	2352	1.55		2544	1.71	*	2406	1.37	~
NEGATIVE AFFIXES									
dis/unbelief	474	0.31		472	0.31		205	0.12	~
dis*	218	0.15	*	45	0.02		82	0.04	
less	97	0.06	*	32	0.02		37	0.02	
in*/il*/im*/ir*	89	0.06	*	44	0.03		58	0.04	
mis*	85	0.06	*	9	0.01		39	0.02	
un*	118	0.08	~	196	0.13		198	0.11	
SUBTOTAL	1081	0.72	*	798	0.52		619	0.35	~
IMPLIED NEGATION									
except	260	0.17	*	146	0.09		183	0.10	
unless	96	0.06	*	23	0.02		34	0.02	
without	60	0.04		49	0.03		119	0.07	*
any	699	0.46	*	244	0.20		351	0.20	
SUBTOTAL	1115	0.73	*	462	0.34		687	0.39	
ALL KEY NEGATIVES	4548	3.00	*	3804	2.57		3712	2.11	~

Table 2. Reasoning and Negation.

3.3. PUNISHMENT. Irving's intended audience of children may account for his choice of terms related to wrongdoing (Table 1). He leads on the simple words *bad*, *wrong*, *kill*, and especially on the more complex and terrifying word, *torment* (.20%). Arberry prefers *evil* and the unusual term *chastisement*, perhaps trying for eloquence. Ali's distinctive leads are clear: *reject* and *sin*.

Irving avoids *evil* and *sin* when he can. He conveys negative messages with his overall vocabulary, including negative affixes such as *mis-*, *dis-*, and *im-*. He also implies negation with words like *except* and *unless*. Table 2 shows that he uses these methods of negation nearly twice as often as Ali and Arberry to soften the message for his audience. Irving uses the fewest Key intensives (*all*, *indeed*, *more*, *most*, *often*, *surely*, *verily*, *very*, not shown in a table: .44% for 651 instances, only one third of Ali's 1.34% for 2340 and Arberry's 1.49% for 2129). Another of Irving's ways of tailoring his message for his audience is using more modal forms of verbs: 2.91% of his words are unlisted Key modals: *can*, *could*, *may*, *shall*, *should*, *will*, *would*. (His 4393 instances contrast with Arberry's 3233 for 2.20% and Ali's 3908 for 2.21%, Hartnett Forthcoming a).

All versions include *Hell*. Irving augments 92 *Hells* (.06%) with 28 instances (.02%) of *Hades* 'to maintain the poetical effect.' Arberry reduces *Hell* to .02% and substitutes Hebrew *Gehenna* 73 times (.05%). Ali sticks with *Hell* 95 times (.05%).

WordSmith provides no evidence that Irving softens discussion of problem topics for the young readers he mentions. He is least hesitant discussing *sex*, 24 times in contrast to Arberry's single instance and Ali's 4 (Hartnett, Forthcoming c). His usually gentle methods of negation do not decrease his negation of *woman/women*, which resembles Arberry's and Ali's (36% in Irving, 34% in Arberry, and 32% in Ali). Irving's lead on all words for warfare, both Key and nonKey, is not significant (.26%, but .21-.24% elsewhere, Hartnett, Forthcoming b).

4. CONCLUSIONS. These tabulations illustrate how corpus analysis tools can contribute objective statistics that lead to hypotheses about contexts. Irving is clear, gentle, and least prescriptive; he softens messages for his literate Western audience by conveying negation with his overall vocabulary. The non-Muslim Arberry uses the most words for describing the Islamic faith in an eloquent but difficult style. Ali focuses more on the practice of faith than on defining it, because he can assume the previous knowledge of his vigorous minority audience; he knows the cultures and satisfies the needs by substituting reasoning for reading.

Although many of the Qur'an's words dealing with religion have similar totals, KeyWords by WordSmith definition vary significantly to establish objective comparisons. Corpus analysis tools such as WordSmith can examine and compare other texts. It would be interesting to compare Arberry's version with one by an eloquent, scholarly, British Muslim working with Arabic culture in the 1950's. Corpus comparisons could reveal attitudes and emphases not immediately apparent to the casual reader and thus contribute to critical discourse analysis of many texts, such as other religious documents, literary works, and historical accounts by political opponents.

This exploration shows that often lexical variations can be related to the purposes, cultures, and intended audiences. Although it is absolutely essential that alternatives in wording and full contexts be sufficiently considered, corpus analysis techniques can hypothesize useful correlations.

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REPETITION IN NEWS ANALYSIS DISCUSSIONS AS A TOOL OF IMAGE PROJECTION

STACY KRAINZ
The University at Buffalo-SUNY

A NUMBER OF PREVIOUS STUDIES (Halliday & Hasan 1976, McFarland 1977, Tannen 1987, Brinton 1988, Wong 2000) have investigated repetition as a discourse phenomenon. Various types of repetition have been investigated (Johnstone 1994), both other-repetition (Nofsinger 1988) and self-repetition. Halliday and Hasan (1976) identify self-repetition—of both nouns and pronouns—as a cohesive device with an indexical function, and repetition in conversation has been shown to aid in production, comprehension, and interaction (Tannen 1989, 1998). In addition to these general functions of repetition, there are specific effects that occur in distinctive contexts of use. In a study of unscripted televised news analysis discussions in the United States, for example, repetition is shown to be a tool of image projection, especially in terms of projecting a sense of tension in the discussion.

1. DATABASE. The findings are based on an analysis of 49 face-to-face news analysis discussions from five programs on American broadcast television channels¹. Each discussion was videotaped, and transcripts of all 49 discussions were obtained². Public Broadcasting System (PBS) programs comprise the bulk of the database, which includes 15 news analysis discussions of *The NewsHour* (with Jim Lehrer) and 15 complete *Washington Week* programs. The remaining 19 discussions in the database are from commercial broadcast television channels—five discussions from *Meet the Press* (on NBC), six discussions from *Fox News Sunday* and eight discussions from *This Week* on ABC.

Weekly news analysis discussions tend to be recorded on the weekend, when various news professionals are asked to review the preceding week's news events. PBS news analysis discussions are typically recorded on Friday, and the commercial broadcast public affairs programs in the database are all recorded on Sunday morning. The commercial public affairs programs recorded for the database are one hour long; they normally begin with perhaps two interview segments with politicians or other newsmakers, and they usually conclude with a face-to-face discussion, also called a 'roundtable' discussion, among news professionals, most often journalists from nationally known news publications such as *Newsweek* or *The Washington Post*. Notably, the interaction of the roundtable discussions in this database is not overly contentious; speakers may have different points of view or vocal disagreements, but the Sunday morning discussions rarely involve shouting, personal insults, or other overtly boorish behavior.

Alliterated Phoneme	Sunday Programs	Shields and Gigot	Washington Week	Total number
/b/	0	1	5	6
/d/	4	2	1	7
/f/	4	0	3	7
/g/	0	1	0	1
/k/	1	0	0	1
/l/	3	2	1	6
/m/	3	0	3	6
/n/	1	0	1	2
/p/	4	6	6	16
/r/	1	0	2	3
/s/	2	3	3	8
/t/	1	2	4	7

Table 1. Number of phrases with alliterated consonants

The discussions on PBS are even more civil than those on Sunday morning. *The NewsHour* regularly schedules news analysis on its Friday evening program; during the collection of data, the Friday analysis was given by syndicated columnist Mark Shields and *Wall Street Journal* columnist Paul Gigot, each of whom appeared in 14 of the 15 *NewsHour* analysis discussions. While they were specifically expected to represent opposing viewpoints (Gigot as the more conservative of the pair), they always maintained a courteous demeanor, avoiding not only shouting or personal attacks but also noncooperative overlaps. *Washington Week* is typically even more cordial; unlike the *NewsHour* speakers, *Washington Week* speakers are selected to summarize and analyze specific news stories without presenting opposing viewpoints. *Washington Week* discussions were therefore the most cooperative discussions in the database. Instead of using conflict to stimulate interaction, speakers use rhetoric, including repetition, to enliven the discussion. As a result, scores of examples of repetition, both phonological and lexical, could be found in the database.

2. RESULTS. Two types of repetition are found in the discussions—phonological (70 examples; see Table 1) and lexical (166 examples; see Table 2). Not every type of phonological and lexical repetition noted by rhetoricians (cf. Harris 1997) is found, however.³ Specific patterns of phonological and lexical repetition occur in significant quantities in the database, as described in the following subsections.

2.1. ALLITERATION. Studies of phonological repetition in poetry (Allen 1968, Leavitt 1976) have shown that various patterns of phonological repetition (e.g. assonance, alliteration) with various degrees of originality are used in poetry. Roundtable discussions, however, are unscripted discussions, and phonological repetition tends to

occur in specific patterns, often employing familiar phrases. The following pattern of phonological repetition occurs most often in the database: the repetition of the *initial* consonant sound(s) of two *consecutive content* words, as in (1) through (3).

- (1) **p**artisan **p**olitics (Juan Williams, *Fox News Sunday*, March 15, 1998)
- (2) **s**peaking of **s**pirits (Gloria Borger, *Washington Week*, January 2, 1998)
- (3) the **s**ource of the **s**tory (Mark Shields, *The NewsHour*, January 27, 1998)

As mentioned, alliteration in news analysis discussions is often of familiar phrases, such as in (4) through (7).

- (4) **d**ubious **d**istinction (Mara Liasson, *Washington Week*, January 16, 1998)
- (5) **l**egal **l**oophole (Tony Snow, *Fox News Sunday*, March 29, 1998)
- (6) **m**ental **m**echanics (George Will, *This Week*, March 15, 1998)
- (7) a **p**attern and **p**ractice case (Gloria Borger, *Washington Week*, March 6, 1998)

In addition, the phonological repetition found in the database tends to be of sounds that are low on the sonority scale, as Table 1 shows.

It is noteworthy that more than a third of the alliterated phrases in the database repeat an initial voiceless plosive, with more than 20% of the alliterated phrases repeating an initial /p/, especially on PBS programs, as in (7) and (8).

- (8) In Washington, **p**ower is the **p**erception of **p**ower. (Mark Shields, *The NewsHour*, January 23, 1998)

An additional pattern is in the imagery suggested by the alliterated phrases. Round-table speakers often use phonological repetition in phrases that suggest tense or negative situations, such as conflicts in politics, tension between politicians and the media, and negative feelings toward members of political parties, as in (9) through (11), respectively.

- (9) But isn't it fair to **f**ight **f**ire with **f**ire? (Sam Donaldson, *This Week*, March 15, 1998)
- (10) [T]he deposition... is going to have a lot of details that are going to get **t**abloid **t**reatment on **t**elevision. (Paul Gigot, *The NewsHour*, March 13, 1998)

- (11) Disappointed, **dis**affected Democrats who are kind of **dis**gusted with this whole thing are going to stay home. (Mara Liasson, *Fox News Sunday*, March 22, 1998).

PBS discussions tend to be serious and avoid humorous alliterative phrases. On commercial broadcast programs, however, speakers are more likely to use an alliterated phrase to be playful or ironic. Tony Snow does this when he incorporates the alliterated title of an infamous pornographic movie, *Debbie Does Dallas*, into his closing remarks for the program.

- (12) An entertainment industry mystery is bedeviling Washingtonians these days. They want to know why the movie *Primary Colors* is a bomb. Despite a big budget and big names, the flick has slipped in six weeks, from number two on the charts to oblivion. **Debbie** made more **do**ing **Dallas**, and inquiring Washingtonians want to know why. (Tony Snow, *Fox News Sunday*, April 19, 1998)

Through both the choice of lexical items and the choice of sound symbolism (cf. Hymes 1960), news analysts use alliteration to project an image of news stories, occasionally as ironic, but more often as tense.

2.2. RHETORICAL SCHEMES OF LEXICAL REPETITION. Lexical repetition also occurs in specific patterns in roundtable discussions. Four schemes of lexical repetition are found repeatedly in the database, as listed, defined, and illustrated below in order of descending frequency (cf. Table 2).

2.2.1. ANAPHORA. The repetition of the same word(s) at the beginning of successive phrases or clauses, as in (13).

- (13) **He wasn't** a public figure. **He wasn't** the official of government. (William Kristol, *This Week*, May 3, 1998)

2.2.2. EPISTROPHE. The repetition of the same word(s) at the end of successive phrases or clauses, such as in (14).

- (14) This is not a constitutional **crisis** or a legal **crisis**; it's a political **crisis**. (Mark Shields, *The NewsHour*, February 6, 1998)

2.2.3. SYMPLOCE. The combination of anaphora and epistrophe (i.e. beginning a series of phrases with the same word(s) while simultaneously repeating different word(s) at the end of each phrase).

- (15) **That's why** liberals don't **like it**. And frankly, **that's why** many conservatives do **like it**. (Alan Murray, *Washington Week*, January 9, 1998)

2.2.4. MESODIPLOSI. The repetition of the same word(s) in the middle of successive phrases or clauses, shown in (16).

- (16) All around the world there were catastrophes and disasters that **didn't** quite happen. Russia **didn't** collapse, nuclear weapons **didn't** spread, as far as we know; Iraq **didn't** run those UN inspectors out, and the Middle East peace talks **didn't** fall apart, not quite. (Doyle McManus, *Washington Week*, December 26, 1997)

Studies of lexical repetition have shown that it can be used to convey subjective impressions. For example, lexical parallelism is typically associated with a rhythmic parallelism in speech (McFarland 1977, Brinton 1988, Tannen 1989), which can produce an emotional impact. Repetition can be used to juxtapose contrasts and emphasize political oppositions, as in (15) and (17).

- (17) Doris is **approaching this from** one prong and I'm **approaching it from** another prong. (William Safire, *Meet the Press*, May 24, 1998)

A sense of tension or conflict may also be suggested by repeating phrasing in a way to highlight certain concepts, such as in (18) through (21).

- (18) What do they call us [Americans] now. They call us the Capital of Global Arrogance. Guess what? **That's what the** French call us. **That's what the** Japanese call us. **That's what the** Germans call us. (Thomas Friedman, *Washington Week*, February 20, 1998)
- (19) **[T]his is about** partisan politics; **it's about** the president's sex life; **it's not about** obstruction of justice; **it's not about** lying under oath. (Juan Williams, *Fox News Sunday*, March 15, 1998)
- (20) **This isn't** evasion. **This isn't** avoidance. **This isn't** failure to file. (Mark Shields, *The NewsHour*, May 1, 1998)
- (21) I mean, this is **seven months of** stonewalling, **seven months of** silent treatment, **seven months of** no comment. (Mark Shields, speaking of President Clinton's public comments on Monica Lewinsky, *The NewsHour*, August 18, 1998)

Repetition magnifies the emotion associated with the words being repeated. For example, if Thomas Friedman had said in (18), 'The French, the Japanese, and the

Germans (all) call us the Capital of Global Arrogance', the negative impact of his statement would have been weakened. A single verb phrase lacks the parallel rhythm found in (18); the repetition provides not only rhythm to engage the listener but also more time for the weight of the ideas to sink in. The remarks of Mark Shields in news analysis discussions provide many examples of using lexical repetition to build a sense of tension in political criticism. As (14), (20), and (21) show, Mark Shields's use of lexical repetition is noteworthy because it tends to include more than two parallel phrases or clauses. With each parallel group of words, he builds momentum in his emphasis of the repeated idea. Yet mere repetition of words cannot easily be identified as overtly subjective language. Through the use of lexical repetition, news analysts can avoid explicit rhetoric of conflict, instead using repetition of phrasing with lexical variation to produce a cumulative sense of tension or other emotions.

3. DISCUSSION. The roundtable discussions in the database are not as contentious as many cable programs are (e.g. *Crossfire* on CNN), but they are expected to be lively. Yet this liveliness must be balanced with an appearance of professionalism. On the broadcast channels, especially on PBS programs, speakers make efforts to portray themselves as serious news analysts; this is evident in their attire and their avoidance of 'unprofessional' (e.g. uneducated or overtly emotional) language. Repetition is useful for roundtable speakers because of what repetition does and does not convey. Repetition does create memorable, often emphatic, dialogue; it does not, however, create an impression of overtly biased and therefore (within the journalistic community) unprofessional behavior. Its properties and effects are useful for roundtable speakers who want to stimulate their analysis of the news.

3.1. PROPERTIES OF ALLITERATION. A survey of news texts, such as the front section news reports of *The New York Times* or *The Washington Post*, shows that alliteration is not used in straight news stories. Straight news reports are expected to be serious and unbiased (Gans 1976), and alliteration may be considered to be playful (and therefore not serious), so it is understandably avoided in straight news reports. Its use in roundtable discussions is effective because roundtable discussions are unscripted, and the alliterated phrases occurring in the database are memorable on both a lexical and phonological level.

On the level of the lexicon, as mentioned, the alliterated phrases in the database are often familiar phrases. Because of this, they are likely to be stored in long-term memory and easy to access in unscripted conversation. In addition, familiar phrases suggesting conflict or tension, such as *feeding frenzy* or *media madness*, tend to be easily understood and easily remembered by the audience.

The phonological patterns of alliteration in the database also have useful properties. The aural impact of sounds has been said to effect some sort of sound symbolism with an 'evocative power' (Hymes 1960:112) that creates an 'undercurrent of meaning' (Jakobson 1960:373). In terms of phonological patterns, the alliteration in the database contrasts with patterns of alliteration in poetry (cf. Hymes 1960, Allen 1968,

Rhetorical scheme	Sunday programs	Shields and Gigot	Washington Week	Total number
Anaphora	25	34	49	108
Epistrophe	12	5	18	35
Symploce	7	2	5	14
Mesodiplosis	0	1	8	9

Table 2. *Number of specific rhetorical schemes occurring on different roundtable discussions.*

Leavitt 1976, LaCure 1995), in which alliterated consonants tend to be sounds higher on the sonority scale, such as nasals, liquids, or semivowels. In roundtable discussions (cf. Table 1), the most frequently alliterated sound is an initial voiceless plosive (/p/), which is normally aspirated in American English and therefore in the lowest position on the sonority scale. The alliteration of voiceless plosives in English, as opposed to the more sonorous alliteration in poetry, is very salient in perception⁴ and is more likely to create an implication of tension in the conversation.

3.2. EFFECTS OF LEXICAL REPETITION. Lexical repetition is also not found in straight news reports, where it is specifically discouraged in order to save time or (newsprint) space. It is, however, found in roundtable discussions, with specific lexical schemes occurring in specific patterns of distribution, as Table 2 shows.

An examination of the characteristics of lexical repetition found in the database suggests that it is used more frequently than phonological repetition (166 vs. 70 instances) because it offers advantages in both the production of discourse and the effects of discourse.

Speakers find lexical repetition useful in unscripted discussions because using lexical repetition gives speakers time to formulate thoughts (Tannen 1989). In other words, speakers can be thinking of what they will say next while repeating previously used phrases, which aids the speaker’s cognitive process. In addition, lexical repetition provides listeners with semantically less dense discourse (Tannen 1989), which aids the listener’s cognitive process.

Lexical repetition is also of value in discussions because of its subjective effects. It is an emphatic device (MacFarland 1977, Nida 1990) with an emotional impact, creating a rhythm that ritualizes discourse, making it seem familiar (Tannen 1989). It has a persuasive function (van Dijk 1983) as it ‘invites participation regardless of the subject matter. In other words, once the hearer grasps the trend of the form, it creates a momentum of collaboration regardless of whether the listener agrees with the premises’ (Burke 1950:58).

Most advantageous to roundtable speakers, lexical repetition does not project an overtly unprofessional image of speakers. In fact, when parallel phrases are spoken with careful, deliberate intonation, speakers may sound more certain, more informed, and more authoritative in their news analysis. Repetition may also help roundtable

speakers to be lively and engaging, but most of the speakers write for the print media, and their professional reputations are important. By using repetition, they can create an emotional impact without seeming overtly biased toward news participants.

4. CONCLUSION. Using repetition is a subtly effective method for news professionals to add emotional emphasis to a discussion without using overtly emotional phrasing. In this way, news analysts maintain an appearance of professionalism by speaking in a manner that appears to be analytical rather than prejudiced. Commercial broadcast programs use alliteration to project an impression of both humor and tension; PBS programs tend to project a more serious image, using alliteration for a less sonorous and more consistently tenser effect. Lexical repetition is also used to project an image of tension, less often on commercial programs and more often (and in lengthier examples) on PBS programs, in which the escalation of rhetoric implicit in lexical repetition substitutes for more overt expressions of emotional rhetoric. Alliterating sounds lower in sonority and using lexical repetition with a rhythm and corresponding sense of momentum (Burke 1950) adds a dramatic flair that seems to reside in the discourse itself rather than in the emotional bias of the speaker.

¹ The 49 discussions were recorded between December 1997 and October 1998. The data gathering phase of the study continued in 1999, when I interviewed 15 news professionals to obtain their reactions to the language of news analysis discussions as members of the speech community. In addition, after selecting rhetorical devices such as repetition for further analysis, I entered each token of a rhetorical device (e.g. alliteration) into a computer database program so that I could sort the usage of rhetorical devices by speaker, by program, and by linguistic properties; this confirmed certain hypotheses and presented evidence for subsequent analysis.

² Transcripts for all 49 discussions were available on the internet. Transcripts for *The News-Hour* and *Washington Week* are posted on the PBS website and are available indefinitely. Transcripts of the commercial broadcasts (i.e. *Fox News Sunday*, *Meet the Press*, and *This Week*) were, during 1998, posted on the commercial broadcast station website a few days after each discussion aired and remained on the website for approximately one week, at which time the transcript for the most current program replaced the previous transcript, and the earlier transcript became unavailable. For a validity check, I examined the transcripts posted on the website and then compared the videotapes of each discussion with its corresponding transcript, making note of any irregularities. The internet transcripts proved to be impressively accurate and complete, with only minor omissions such as hesitation noises (e.g. 'uh') or backchannels.

³ The patterns of repetition found in the database seem to accommodate the needs of the discussion. Alliteration of the initial consonant sound seems to make phrases more memorable, as in (4) through (7), which in turn makes those phrases more easily accessible to the speaker in an unscripted news discussion. Similarly, the frequency of rhetorical schemes of lexical repetition is proportional to the ease of online processing of discourse. The most frequent lexical repetition, anaphora, consists of a simple AB + AC type scheme, in which the speaker uses the repetition of the first element of a parallel phrase or clause as a means to hold the floor while planning the next stretch of discourse (Tannen 1987).

As the complexity of the rhetorical scheme of repetition increases, the number of tokens found in the database decreases, and very complex schemes such as chiasmus, the repetition of ideas in inverted order, or antanaclasis, the repetition of a word whose meaning changes in the second instance, are not found in the database.

- 4 Psycholinguistic studies on auditory perception (going back to Liberman et al. 1967) have been able to demonstrate the particular salience of the delayed voice onset time of voiceless aspirated plosives. A voice onset delay of 20 to 40 milliseconds, as is common in the initial voiceless plosives of American English, seems to be an important feature of speech perception, found even in nonhuman species (Kuhl & Miller 1995).

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THOUGHT DISORDERS IN SCHIZOPHRENIA

DAVID MAURIER & SYDNEY LAMB
Rice University

AMONG THE BEST KNOWN SYMPTOMS of schizophrenia is disordered thought. The condition affects a person's conceptual and linguistic systems. As these are neurocognitive systems, the tools offered by relational network theory may have application to understanding such disorders of thinking. Such an application of linguistics has the potential for an important real-world contribution, as it is estimated that as many as one of every two hundred people develops schizophrenia, expressing at least one of its symptoms to some degree. Yet the mechanisms of the characteristic thinking disorder are not at all well understood.

1. INTRODUCTION: SCHIZOPHRENIA. The term 'schizophrenia' was first used by Bleuler in 1911 to describe a collection of symptoms. Derived from the Greek *schiz*-, meaning 'to divide', and *phren*, 'the mind,' it is an apt term for one of the most common mental disorders. The illness typically begins with an attack of symptoms that begins between the ages of 15 and 30 and has limited duration. In some cases, the attacks will cease and never come again. In others, if untreated, they persist until the victim has reached a relatively permanent state of mental deterioration.

Schizophrenia's symptoms are unmistakably psychotic. They tend to fall into the categories of: *abnormal perceptions or ideas*, *emotional disorders*, *motor or behavioral disorders*, and *formal thought disorder*. It is typical for schizophrenic individuals to exhibit symptoms characteristic of more than one of these categories, though it does not take more than one for a person to be classified as schizophrenic.

Despite the prevalence of schizophrenia, there remains no consensus as to its biological etiology, although it is increasingly recognized as a biochemical disorder with a genetic neurodevelopmental basis. And yet, although genetic factors loom large, if one of a pair of identical twins is schizophrenic the chances are only 30 to 50 percent that the other will be. Research on the genetic factors implicates multiple susceptibility genes in more than one chromosome.

Drug therapy is often quite effective if started early enough, but treatment in the form of psychotherapy is often also employed.

The neurological factors that incite schizophrenia are related to deficiencies in cerebral myelination, affecting cortico-cortical connections, and neurotransmitter deficiency. Eventually if untreated there is some cortical atrophy. The observed symptoms appear to result from defects in neural connectivity, especially involving thalamo-prefrontal circuitry. Prefrontal connections are very important for general executive functions of the cortex. Faulty prefrontal connections can lead not only to impairment of attention but also to a decreased ability to assess the appropriateness

of one's actions (Damasio 1994). More specific neurological phenomena associated with the disease include altered neuroplasticity, deficiency of dopamine neurons in the midbrain, a consequent deficit in prefrontal dopamine, diminution of quantities of dendritic spines, and myelin disruption.

Early diagnosis is very important so that drug therapy can be started before too much damage has occurred, but it can be difficult since symptoms are less obvious in early stages of the disease. The classic method of diagnosis has been interaction. Observing and interacting with an individual leads to conclusions about their mental state. Most of this assessment is based on the individual's speech, as heard in the course of monologue or discourse with the individual. Given that most of our insight into the nature and treatment of schizophrenic disorders is predicated on linguistic observation and analysis, it is important to have a solid framework for evaluating such speech. A reasonably grounded framework for the cognitive basis of language not only prevents us from making incorrect assumptions about the nature of schizophrenic speech production, but may also provide us with otherwise unattainable insights into the condition.

The long-standing framework for such analysis has been primarily based upon analytical linguistics. The function of analytical linguistics is to describe linguistic productions by breaking linguistic units down into their constituents, and analyzing grammar as a set of rules. Although this approach is not without usefulness, the goal should be not so much to describe the verbal productions of schizophrenics as to investigate the underlying cognitive system by means of which the productions are created. For if we understand the neurocognitive system underlying their production of language, it becomes a relatively simple thing to dissect the productions, while the capacity to categorize elements of speech does not necessarily give us insight into the mental activity behind their production.

Neurocognitive linguistics may be conducive to producing an understanding of the cognitive processes that underly verbal productions and the neurocognitive systems that perform these processes. Accordingly, this approach uses linguistic data as a type of evidence for the structure of the cortical system rather than as an end in itself.

2. THE RELATIONAL NETWORK MODEL. With the emergence of computers in the twentieth century as an advanced and transparent means of information processing, a number of eminent researchers involved in the study of the brain and its processes concluded that our own information-processing device must be like a computer. This, in turn, was perceived as lending credence to symbolic theories of language and cognition. In these theories, the mind was viewed as a means of storing and manipulating symbols – a biological computer. However, even the most cursory examination of these models finds them wholly implausible. If our brain is manipulating symbols stored within itself, how does it know which symbols are which? In order to do so, it would require some internal symbol interpreter. Do we then have an internal homunculus sitting in our head, interpreting the symbols that come through? If so, we must ask how the homunculus accomplishes this feat and we are back to where we started.

The approach of symbolic processing, while it may be useful for deconstructing texts into constituents, is clearly of little value in explaining the structure and functioning of the brain. It is on this profoundly flawed basis that many psychologists and pathologists attempt to analyze and understand the speech production of schizophrenics.

An alternative model, referred to as connectionism, was first advanced by Carl Wernicke, a German neurologist, in the latter half of the nineteenth century. For almost a century, it lay virtually stagnant, the victim of harsh criticism and attack. In 1960, Norman Geschwind, a prominent neurologist, revived and revised the theory, forming what became known as the Wernicke-Geschwind theory. There are differing interpretations of the theory, but all agree that the brain contains multiple interconnected subsystems that work in concert. Many of these interpretations stubbornly cling to the notion that there are symbols being manipulated in each of these subsystems, and though they may be improvements on the purely symbolic theories, they remain flawed conceptions to the extent that they persist in maintaining such retrogressive notions.

We may move entirely beyond the symbolic theories by postulating a system in which the brain stores and processes information by means of the activation and strengthening of connections between neurons, so that the information lies in the connectivity. In this sort of model, each connection operates in parallel with all the others. While intuitively this may strike us as far-fetched, it provides a remarkably robust account of natural language processing in humans, and is consistent with the available neurological evidence (Lamb 1999).

This network model has clear applications beyond linguistic analysis. For example, using it, we may hypothesize about the nature of the various subsystems and interconnections in the mind that are involved in transforming the vibration of our eardrum into the experience of music.

From the properties of neurons and analysis of various linguistic data, we may make further stipulations about the nature of the hypothetical relational network that may comprise our brain. First, there appear to be multiple subsystems, each with the potential for a large number of layers of depth. Second, connections between nodes seem to have variable strengths, and can carry gradated amounts of activation, excitatory for some connections, inhibitory for others. The degree of activation that a connection provides will therefore be dependent on its strength and the level of activation being transmitted to it at that moment. Third, nodes have a particular threshold at which, if exceeded by the sum of all excitatory impulses they are receiving minus the sum of all inhibitory impulses they are receiving, they become activated, more or less strongly depending upon the degree to which this sum exceeds the threshold. Fourth, each node initially has a very large number of weak latent connections that, with activation, can become progressively strengthened, and their threshold for activation increased. It is in this manner that the brain learns and changes over time.

Finally, as a consequence of the fact that the model is a network, if a node belongs to the network, it is ultimately connected to all other nodes. That is, a path may be found from any node to any other node within the system.

3. SCHIZOPHRENIC DISORDERS AND RELATIONAL NETWORKS. Before considering thought disorders, let us take a brief look at a couple of other categories of symptoms typical of schizophrenia, asking whether the relational network model of the mind might help to account for them.

3.1. ABNORMAL IDEAS. The abnormal ideas of schizophrenics usually may be classified more specifically as delusions. A delusion is a fundamentally illogical belief held with unswerving conviction in the face of contrary evidence. Delusions within a patient are not necessarily consistent, and it is not uncommon for individuals to suffer from multiple inconsistent delusions. While the content of the delusions is individual, most are relatively easily categorized. These categories include delusions of persecution and grandeur, obsessions, and sexual delusions. A particularly interesting class is that of partial delusions, in which it is clear that the schizophrenic does not entirely believe a given idea, but the idea is so patently bizarre that to have produced it in the first place seems to be indicative of an abnormal thought pattern.

Assuming that our conceptual organization and understanding of the world exists in the brain as a relational network, what might happen if the network were disturbed? If, let us say, due to a neurochemical imbalance or physical dysfunction, the strengths of connections were arbitrarily altered, or there were a weakening of the activation travelling along certain connections? Lacking an internal homunculus, there would not necessarily be any way for the brain to recognize that whatever information was being represented by the network was not accurate, if the misleading connections were sufficiently established.

Paranoid and other delusions, including those entailing hypochondria, grandiosity, and misinterpretation may be seen as dysfunctions in connections between concepts. For instance, obsessions and over-valued ideas may stem from abnormally strengthened series of connections between concepts. Similarly, partial delusions may stem from overdevelopment of relationships between concepts, but not to the point of total delusion.

3.2. ABNORMAL PERCEPTIONS. The primary expression of abnormal perception in schizophrenics is hallucination. Though schizophrenics may suffer from somatic, visual, gustatory, and olfactory hallucinations, the most common ones are auditory. The movie *A Beautiful Mind* was misleading in this connection, as it portrayed the hallucinations of John Nash as primarily visual. This deviation from the facts of the case was indulged in just to allow the film to be more dramatic. Auditory hallucinations are in many respects a primary symptom of schizophrenia, occurring at some stage in most schizophrenic individuals. The most frequently occurring form of auditory hallucination among schizophrenics is verbal, though non-verbal auditory hallucinations such as leaves rustling, banging, or cars starting are not uncommon.

Associated with these abnormal perceptions is the phenomenon of pseudo-hallucinations, in which a schizophrenic observes and recognizes a hallucination as existing only in their mind. That is, they hear voices 'in their heads,' or see things

in their 'mind's eye.' According to some accounts, many supposed hallucinations of schizophrenics fall into this category upon closer examination.

One of the more popular theories of abnormal perception in schizophrenics holds that they lack the selective filter of attention that most individuals have. That is, while you and I can focus on certain elements of sensory input and more or less disregard others, schizophrenics may have either a weakened or nonexistent capacity to do so, and thus have their sensory processing faculties overloaded. In the case of auditory processing, this might result in non-speech sounds being brought into awareness as speech. This theory is almost certainly false or at the very least incomplete.

In fact, as one of its original proponents pointed out, it assumes a steady stream of sensory input of the same modality to serve as the basis for misinterpretation. This assumption is not a valid one. There are numerous recorded cases of patients experiencing hallucinations without the benefit of sensory input of the same modality as the hallucination.

Furthermore, one might be tempted to ask: how is the sensory stimulus transformed into a hallucination? By what manner are we supposed to presume that the honk of a car horn is transformed into the hallucination of a completely grammatically correct and coherent verbal dialogue?

The relational network model, intended as a real world model of the brain, might provide a more satisfying theory. Let us assume a mental network in which, due to some dysfunction, some connections are weakened or even severed, including inhibitory connections, while perhaps some nections have had their thresholds lowered. The result would be a certain haphazardness in the pathways activated and could lead to the activation of perceptual nections. Activated nections within the system of sensory perception might then perform their task as if they had been activated by their proper sensory receptor.

4. FORMAL THOUGHT DISORDER. We now come to the main topic of this paper. The primary evidence for formal thought disorder is verbal incoherence. It is commonly characterized by seemingly illogical progressions from concept to concept in discourse. Along with the frequently observed absence of coherence from one sentence to another, there is often a marked lack of clarity in the choice or meaning of individual words or phrases.

In one manifestation of formal thought disorder known as derailment, a patient's focus drifts from the original topic, so that the topic becomes increasingly less overtly related to the initial area under discussion. In the following example, an interviewer had related a story to a schizophrenic suffering from formal thought disorder, and requested that the patient repeat it back to him:

A donkey was carrying salt and he went through a river, and he decided to go for a swim. And his salt started dissolving off him into the water, and it did, it left him hanging there, so he crawled out on the other side and became a mast-odon... It gets unfrozen, it's up in the Arctic right now; it's a block of ice, the

block of ice gets planted... It's forced into a square right? Ever studied that sort of formation, block of ice in the ground? Well it fights the permafrost; it pushes it away and lets things go up around it. (McKenna 1994:13)

The relational network model may help us understand such deviations. After all, implicit in the name 'derailment' is the suggestion that there is some sort of deviation from a pathway being traveled. In the conceptual network of the derailing individual associated conceptual sections are activated in the course of discourse, rather than being suppressed by inhibitory connections stemming from the focus of the conversation.

The plausibility of this explanation is enhanced by the fact that schizophrenic speakers tend to derail in a remarkably logical fashion that illustrates the conceptual relations underlying the discourse. In the example provided above, the speaker makes 'inappropriate' transitions from salt dissolving in water to ice dissolving in water, then to ice, then to frozen mastodons, from them to the Arctic and to permafrost. None of these relationships should come as much of a surprise to us. In fact these associations are doubtless present in each of our minds. It is simply that we are better at inhibiting the transitions to them during the course of conversation, and better at maintaining attention to the discourse topic.

In another manifestation of formal thought disorder called 'incoherence,' speech is incoherent and seemingly meaningless. The following dialogue transpired between an interviewer and a schizophrenic patient:

- I: Have you been nervous or tense lately?
- P: No, I got a head of lettuce.
- I: You got a head of lettuce? I don't understand. Tell me about lettuce.
- P: Well, lettuce is a transformation of a dead cougar that suffered a relapse on the lion's toe. And he swallowed the lion, and something happened. The... see, the... Gloria and Tommy, they're two heads and they're not whales. But they escaped with herds of vomit, and things like that. (McKenna 1994:13)

While at first glance the patient's speech appears chaotic, it actually has considerable structure and coherence, like that of the previous example and the next one to be considered. Every sentence is grammatical, although there is one case of a false start, but it is like the false starts that occur in normal speech. Also, two of the five sentences are even coherent conceptually if considered by themselves, neglecting context. This kind of speech, which may at first glance show some resemblance to the speech of Wernicke's aphasics, is actually quite different in this respect, as the Wernicke's aphasic often has great difficulty maintaining coherence even from the beginning to the end of a single sentence.

The source of this apparent failure of the patient's cognitive system may be defective conceptual connections, along with diminished inhibition of conceptual nodes. Deficient attention doubtless also plays a role. But despite these faulty interconnections there is some coherence to the dialogue, even if not of the more normal type.

When the interviewer asks the patient about feeling nervous or tense, the patient immediately makes the leap to mental health and well being, making the phonological connection between the 'head' of lettuce and the 'head' of mental health. His second utterance is considerably more difficult to follow but is still not without coherence. There is a recurring theme of animals, from the cougar, to the lion, to the whale, to the reference to herds. We thus get clear evidence of conceptual connections present that are in this case quite similar to those presumably present in normal people. There is a secondary thread present in references to the body, toe, and heads. Finally, Gloria, Tommy, and vomit may be interrelated, inasmuch as Tommy sounds like the name of a small child, and there is unquestionably a relationship between small children and vomit. The fact that there are so many consistent conceptual relationships in the discourse of even the most incoherent schizophrenic speakers is yet another piece of evidence for the hypothesis that conceptual information is organized in the form of a relational network.

A third example illustrates the value of assessing schizophrenic speech with attention to the relational structure of the mind. This exchange, in which a psychiatrist interviews a schizophrenic in front of a group of students is a particularly chilling example:

I: Where are you?

P: You want to know that too? I tell you who is being measured and is measured and shall be measured. I know all that, and could tell you, but I do not want to.

I: What is your name?

P: What is your name? What does he shut? He shuts his eyes. What does he hear? He does not understand; he understands not. How? Who? Where? When? What does he mean? When I tell him to look he does not attend properly... (Wrobel 1990:13)

From this, the interviewer concludes,

Although he undoubtedly understood all the questions, he has not given us a single piece of useful information. His talk was... only a series of disconnected sentences having no relation whatever to the general situation (quoted by Wrobel 1990: 13).

But as Laing (1979) points out (Wrobel 1990:13), this assessment by the psychiatrist who first reported the interview is very shallow indeed. In his first response, the patient is stating outright that he is aware that he is being evaluated, and is averse to it. In his second response, the patient mockingly adopts the role of the interrogator, expressing his discomfort at being scrutinized. If the interviewer had considered the conversation in the context of relational networks, he would likely have realized

the blatant relationship between the patient's responses and the context of the interview, rather than dismissing the patients' language as abnormal and uninformative.

5. CONCLUSION. It appears that relational networks can help us to understand language processing not only in normal individuals but also in schizophrenics, and that schizophrenic thought disorders may even furnish additional evidence in favor of the principle that our mental information is represented in the form of relational networks. It is possible that such an approach may prove useful in the early diagnosis of schizophrenia. Our understanding of the relational networks of the mind may be enriched by the study not only of the normal functioning but also of some of the most severe and abnormal dysfunctions that can afflict the human mind.

A benefit of evaluating schizophrenics in the context of the relational network model may be in humanizing schizophrenic individuals in the eyes of others. If, by knowing that schizophrenics' cognitive systems are not so dissimilar from our own we arrive at a greater understanding of and sympathy for those afflicted, we are all better off.

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THE PHONOLOGY OF ANCIENT WRITTEN LANGUAGES AND THAT OF THEIR RECONSTRUCTED PREHISTORIC SOURCES

SAUL LEVIN

State University of New York at Binghamton

In memory of Ruth Brend, past president of LACUS and secretary-treasurer

AMONG THE LANGUAGES that were written down thousands of years ago, knowledge of a few was transmitted to later generations, while the others sank into total oblivion. The ones that did survive were no longer anyone's mother tongue, but were taught by professional men in a quite different setting.

Accordingly, Latin became a school language¹. The schoolboys who heard or read this verse of Catullus (13.1)—

CENABIS.BENE.MI.FABVLL.E.APVD.ME

understood it as perfectly as the poet's friend did, to whom he sent it—as a joke—in the first place; so did contemporaries who got hold of a copy of the poem. The schoolboys after them learned too the Latin language well enough to catch the sense 'You will dine well, my Beanie, at my place,' including the cognomen or pet name Fabulle, a diminutive from the common noun *faba* 'bean'².

Those who kept speaking, reading, and writing Latin may have felt—and expressed to one another—that they were a community of Latini *quia latine loquimur* ('since we speak Latin'). But this is only a conjecture. The literary documentation for it comes many centuries later. In *La Divina Comedia*, the poet Dante, speaking in the Tuscan vernacular to those whom he meets in the underworld, or in Purgatory, asks them whether there are any Latini in those parts. He means what we would call 'Italians'. What makes them a speech community like the ancient Latini is that they understand one another's vernacular, insofar as it keeps close to the sounds that are still recognisably Latin—even though modified variously in Florence and elsewhere.

The schoolteachers did not assume that the pupils already had a normal Latin pronunciation, or would pick it up through mere exposure in the classroom. Instead someone put together a didactic poem, telling how to articulate the sound of each letter in turn; thus:

*utrumque latus dentibus applicare linguam
C pressius urget dein hinc et hinc remittit
quo uocis adhaerens sonus explicetur ore*

C urges the tongue to bend both sides tighter to the teeth, then it lets go from here and from here where sticking, the sound of the voice may be unfolded out of the mouth

*G porro retrorsum coit et sonum prioris
obtusius ipsi prope sufficit palato*

G makes it twisted backwards and shifts
the sound of the aforesaid [letter] more
bluntly close to the palate itself

(Terentianus Maurus, *De litteris* 194–98)

This proves that the initial consonant of *cenabis* (and numerous other words) is a voiceless velar plosive³.

Those who had thus become acquainted with the classical Latin literature, both in verse and in prose, had a reason to pride themselves as the heirs of a higher, finer culture, more artistic than that of ordinary people. They looked forward to appointments for which their education qualified them. Furthermore, the growth of the Christian religion breathed new life into the language of the schools.

But in the long run the classical pronunciation was undermined by the surrounding vernacular. No language is ever so entirely uniform and consistent in phonology as to leave no room for variation between the generations; even the Sanskrit of the Brahmins, in parts of India, developed some regional peculiarities. Latin, since it had spread widely through the Roman empire, was vulnerable because the population remained unassimilated socially, and ethnically diverse: the language was liable to change some of its consonants as well as vowels.

The velar plosives underwent a sort of affrication everywhere—except for part of Sardinia (and the coast of Dalmatia). There the verbal noun *cena* ‘dinner’ kept the [k-], but everywhere else this initial consonant, when followed by a front vowel, changed to [č-], and several regional splits carried this further. One of the end-products was the Castilian [d-], as in *ciento* (< Latin *centum* ‘a hundred’). Even the Latinists at school were affected by the home language, which had become second nature to them. Most of them in Italy said [čen’abis] for the Latin denominative verb ‘you will dine’; in their vernacular the noun *cena* ‘dinner’ had become [č’ena]⁴.

In one way or another, all over Europe, the Latin that millions learned at school was tinged by minor corruptions, although it went on functioning for centuries as a medium of communication among officials and intellectuals. An indirect result of the mental efforts of sundry Europeans was that the entire field of antiquity became a major preoccupation of influential people.

Above all, in the universities of Germany the study of *Altertumswissenschaft* flourished. Every detail of the Latin language was researched—as meticulously as the lately rediscovered layers of ancient buildings in the city of Rome, and throughout the Mediterranean. Georg Curtius (1868–77) and others dug up the evidence for all the Latin sounds, so as to prove (for example) that in *cenabis* the final consonant was optionally omitted, and so was the final vowel of *Fabulle*.

The great triumph of *Altertumswissenschaft* came when the German universities absorbed the discovery of the Englishman, Sir William Jones, that Sanskrit is related to the ancient languages of Europe. He theorized that they had ‘sprung from some common source, which, perhaps, no longer exists’ (quoted by Cannon 1991:310). The German scholars compared the languages in detail and thereby deduced which fea-

tures of the ancestral Indo-Germanisch (or Indo-European) should be reconstructed to serve as the sources of sounds of the words in Sanskrit and of their counterparts in Greek, Latin, Gothic, and other early branches of the Germanic family.

They began by supposing that Sanskrit was the most conservative of the entire family, but their successors have reconsidered and extensively revised the details. To account for the divergence of the word for 'father'—Old English *fædr* (*fæðr* in the accusative case) from Sanskrit पितॄम्, Greek *πατέρα*, Latin *patrem*—Verner (1875) explained that the pitch of the second syllable shifted in proto-Germanic: it lost its original prominence among the syllables of the word; but a vestige of that former sound lingered in the quality of the consonant—a voiceless plosive [t] in Sanskrit, Greek, and Latin, but a fricative ð in early Germanic due to the lingering influence of the preceding vowel.

The validity of reconstructed sounds, of a prehistoric unrecorded language, is in proportion to how well they serve as the starting points—for the actually known sounds in the separate but unmistakably related languages, recorded since the dawn of history or down to the present. We rely upon the literacy of those who took specimens of each language and wrote them down so that anyone sharing that literacy could read them off.

The current ideology, prevailing in regard to scientific evidence, inclines us to base a description of a given language upon specimens of it now available orally. We are really in a position, however, to weigh the importance of all kinds of evidence. To take a striking context, an impartial investigation could record English as spoken in London, and Greek as now spoken in Athens. But if we are curious how each language changed over the centuries, we must turn to a great body of written evidence. To summarize the many changes in English since Shakespeare's time around 1600 is at least as complicated as those in the Greek of Athens now and in 405 B.C., when Aristophanes' comedy *The Frogs* had an actor playing the recently deceased Euripides.

The phonetic differences that are there to be detected in English are generally more *problematic* than those in Greek. I can trace the letter *H* in the second syllable of *AΘΗΝΗΣΙ* 'in Athens' through a series of phonetic changes, from the diphthong [εΗ] of early Ionic to the current [i] (Levin 1971:263-270; Meisterhans 1900:146). On the other hand, studying the last word of this verse of Mark Antony (from *Julius Caesar*)

He hath brought back many captives home to Rome,

it is hard to determine when and how the variable pronunciation of the foreign city's name got started in English. Shakespeare's [ru^wm] gave way ultimately to [ro^wm]—which nowadays we unwittingly find acceptable, although it involves here an unpoetic, inartistic rhyme, linking *home* in the fourth measure clumsily to *Rome* in the fifth⁵.

For recapturing the sounds of ancient Greek, we are especially indebted to the German Altertumswissenschaft of the nineteenth century. Scholars—whom Das Deutsche archäologische Institut bei Athen subsidized—combed through thousands of inscriptions, illustrating how (among other things) the pronunciation of Attic

gradually but discernably shifted, as the generation that grew up saying [atʰɛ:nɛ:si] died out toward 400 B.C.; their successors went over to [-ais] for the dative plural case-ending, instead of [-ɛ:si]⁶.

More than anything else, linguistics as a profession must look back upon the men, mostly nameless, who cared enough about the language of their people to write and teach it. That is the major foundation we build on, as we enlarge our knowledge of all the languages of the world.

¹ To call it a 'dead language' is an old joke, which implies that a language current in a certain population can simply be picked up with no particular effort.

² In languages on the whole, the name (or names) of a person or a place is a part of the normal vocabulary. What made it appropriate to this or that person, or place, is often lost through ignorance of the language in which the name originated. For example, very many Anglophones now know a woman or a girl called Belle; but only a minority realize that in French it is the feminine form of an everyday adjective that means 'nice' or 'pretty'.

³ Essentially the same phonetic information was transmitted in prose by Marius Victorinus, *Ars grammatica* 1.6, p. 2454.14–24 (H. Keil 1874:33, 331).

⁴ Their Latin pronunciation of this noun, with the accented first syllable [č'ɛ-] instead of the ancient [k'e:], is complicated by the uneven development of the vowels in Tuscany and in the lower half of the Peninsula during the post-classical age.

⁵ *Oxford English Dictionary*, s.v.

Rome (rō^wm) ... The pron[unciation] (ru:m), indicated by the old spelling *Room(e)* and by the rime with *doom*, etc. was retained by some educated speakers as late as the 19th cent.

⁶ Modern Greek has kept up some ancient endings of the other cases, but the dative case has all but disappeared. The city is still [sad'inas] in the accusative (spelled σ' Ἀθήνας now) 'to(ward) or in Athens'. However, at the heading of a letter—and there only—does ἐν Ἀθήναις 'in Athens' serve as an archaic hold-over, still familiar. If read aloud, the phrase is still [enad'ines].

Quite a few cities of ancient Greece were feminine plural nouns. Why this one was so named is a secret of some prehistoric language, which lost out to Greek long before the invention of alphabetic writing. The likeliest guess is that the Acropolis in the center was known as Ἀθήναι, already in pre-Greek, because of the little owls that haunted it. (In Greek they were γλαῦκες, and the people of the area continued to revere the birds as the goddess's emblem.)

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COMPLEMENTARITY: VERB TYPES AND DISCOURSE TYPES IN BIBLICAL HEBREW

ROBERT E. LONGACRE

University of Texas at Arlington and SIL Inc.

THE PURPOSE of this paper is to demonstrate that there is a certain complementarity between verb types and discourse types in Biblical Hebrew (BH). By verb types I mean the main so-called 'tense' forms of the verb which are traditionally called by the following names: the perfect, the imperfect, the w-consecutive with the perfect, the w-consecutive with the imperfect, the participle, the zero verb in the verbless (or nominal) clause, and the command forms: imperative, jussive, and cohortative (Cowley 1910; Waltke & O'Connor 1990). Since some of these reference labels are confusing and cumbersome, I follow the convention of referring to them by the consonants of the corresponding third person singular *qal* forms of the paradigm verb *qtl* 'kill'. Consequently, the following labels are used:

perfect = *qtl*

imperfect = *yqtl*

the w-consecutive with the perfect = *wqtl*

the w-consecutive with the imperfect = *wyyqtl*

The participle and the zero verb in the verbless clause are referred to as *par* and #, respectively. There are also command forms which I will refer to as IMPV (imperative), *yqtl.j* (jussive, i.e., third person commands) and *yqtl.coh* (commands in first person, i.e., 'let me/us do so-and-so').

As can readily be seen, the BH verb tense/aspect system involves more than a simple opposition of the two forms perfect (*qtl*) and imperfect (*yqtl*) which are sometimes referred to as the suffixal versus the prefixal tenses. The presence of two consecutive tenses, *wqtl* and *wyyqtl*, results in multiplying the basic opposition by two; this yields four tense/aspect forms, each with its own functions and meanings. But to these we must add the participle, the zero verb (in the verbless clause) and the command forms.

The discourse types of BH can be summarized as follows:

1. Narrative, dividing into story and report
2. Predictive, dividing into formal and informal predictions
3. Procedural, dividing into how-to-do and how-it-was-done
4. Instructional
5. Juridical

6. *Riyb*, i.e., indictment, arraignment, dividing into God arraigning people versus people attempting to arraign God
7. *Qinah*, i.e., lament
8. Exposition, dividing into description and census reports
9. Hortatory, with prayer as an important subdivision

It is often convenient to refer to numbers 2–4 above as the ‘P complex’ of discourse types, because all involve the semantic element **projection** (Longacre 1996:9) and have *wqtl* as backbone (Longacre 1994).

It is the formidable task of this paper to demonstrate in ten pages that for each discourse type or subdivision of that type there exists a verb form which either constitutes its backbone or at least predominates within it. Illustrative discourses cannot be given because of space limitations, but illustrative discourses in the Hebrew Bible will be cited by reference.

1. NARRATIVE. With respect to the subdivisions of narrative, much of Genesis is story, but many of the accounts of particular kings of Judah and Israel lack plot structure (narrative template) and are simply reports (Pratt 1993). Both sorts of narrative take the *wyyqtl* form as backbone, which gives way to noun + *qtl* when for any reason a noun is shifted to the fore of the clause. Thus, we find in Genesis the stories of the creation and fall, the flood narrative (Longacre 1979), and the stories of the patriarchs culminating in the Joseph story (Longacre 1989). In Exodus there is the story of the bondage and deliverance, in Numbers and Deuteronomy the stories of the wilderness journeyings, in the books of Samuel the struggles of Saul and David and the reign of the latter—including the episode with Bathsheba and Nathan’s parable. I and II Kings have both reports and stories—with the stories of Elijah and Elisha enlivening the scene. Joshua, Judges, and Ruth are mainly story. The books of Chronicles are again mixtures of stories and reports, with Ezra, Nehemiah, and especially Esther more story than report. Narrative also figures marginally in the poetic books. Thus we have narrative psalms, narrative prologue and epilogue in Job, some autobiographical narrative in Ecclesiastes, and recitals and dream narratives in Canticles—with the latter employing *qtl* as backbone in short narrative sequences. Finally, bits of narrative occur in the Prophets—especially when they resort to parables. The book of Isaiah embeds a narrative in its center, i.e., chapters 36–39.

2. PREDICTIVE. A classic bit of predictive discourse occurs in I Samuel 10:2–8; it demonstrates the use of *wqtl* as backbone in many predictive discourses. The prophets contain predictive discourses in a typical collage of prediction, *riyb*, and exhortation. The predictions of good or evil are typically contingent upon whether those who hear the *riyb* and the exhortation respond in obedience or not.

I have labeled ‘formal prediction’ those which have a *wqtl* backbone, but even here departures from the backbone are occasioned by bringing a noun to the fore of the clause followed by a *yqtl* verb, and by *yqtl* clauses in opening or closure. For some

examples of this kind of discourse, cf. Numbers 24:15–19 (one of Balaam's prophecies), Isaiah 2:2–4, Jeremiah 29:10–14, and Ezekiel 6:3–7.

I label 'informal prediction' predictions that have a *yqtl* backbone, as in Isaiah 1:24–31, and Isaiah 35:1–2. Most of Isaiah 40–66 is hortatory but motivation in these hortatory discourses is often supplied by embedded informal prediction. In these chapters we especially note lyric embellishment (e.g., Isaiah 41:15–20), but this is also noticeable in Isaiah 1:30–31 in the first passage cited in this paragraph as well as Balaam's oracle cited above under formal prediction.

3. PROCEDURAL.

3.1. HOW-TO-DO-IT PROCEDURAL DISCOURSE. Leviticus, along with other materials, contains a quantity of procedural discourses, i.e., routines for various sacrifices, for purification of women after childbirth, for examination of people in regard to skin eruptions, bodily discharges, taboos relevant to the priests, the putting on of prescribed feasts, vows, and other matters. Juridical material typically occurs as a matrix around these procedural discourses. Procedural discourse of this sort has a *wqtl* backbone, but differs from prediction in several ways. For one thing, how-to-do-it procedure prescribes ritual which any qualified person can implement rather than foretelling what will happen.

Leviticus 4:1–2 prescribes the ritual required to make atonement for a sin committed in ignorance—even if committed by an ordained priest. It prescribes 12 steps (sequential theses) from presenting the sacrificial animal to disposing of the remaining parts which are not used in the ritual. Each of these sequential theses is encoded as a clause with an initial *wqtl* verb. Topicalized sentences, such as '(as for) the rest of the blood let him do so-and-so with it' are off the line and encoded in a *Nyqtl* clause.

Leviticus 2:1–10 is a procedure for making the meal offering; it consists of ten sequential theses each encoded in a *wqtl* clause, but the sequence is interrupted by the specification of alternative forms in which the meal offering may be presented: uncooked, baked in an oven (v. 4), cooked on a flat plate (v. 5), or made in a pot (v. 7). The material in these verses can be considered to be embedded juridical discourse; like pieces of legislation on the same subject, the first alternative is expressed with *kiy* for 'if' and the latter alternatives with *>im* for 'if'.

In these and other how-to-do-it procedures not cited here, the main-line forms are *wqtl*'s. When *yqtl* forms occur, they are frequently *Nyqtl*, i.e., they occur when certain nouns are briefly topicalized. *Yqtl*'s occur in negated clauses or in clauses which contain some other preverb particle. Clauses with *qtl*'s occur to sketch an established situation or a action past relative to the proceedings. Hortatory clauses, especially with the infinitive absolute occur in embedded juridical discourse. Verbless clauses figure in as paraphrases within a reported Field of Vision in an Awareness quote; it is characteristically the Awareness Quote Formula which ties the whole structure into the line of procedure. That is, something on the order of the following occurs: 'The priest will look, and behold [certain symptoms he will see or not see].'

3.2. HOW-IT-WAS-DONE PROCEDURAL DISCOURSES. Discourses of this sort typically are found embedded in narrative. Whenever in the course of a narrative a situation is encountered which calls for a routine or customary sequence of actions which is assumed to be repeated whenever appropriate, a discourse switch clue occurs, and there is a shift from narrative genre to how-it-was-done procedural discourse.

The semantic parameter *projection* is still present here in how-it-was-done procedural discourse—but the projection is from the viewpoint of the participants in the narrative rather than from our perspective as readers. At the point where the procedural discourse of this sort intervenes in a narrative, the participants involved at that point activate a routine which is possible there or in similar circumstances.

A typical discourse of this sort is found in Genesis 29:2–3. Here on Jacob's arriving near the village of his destination he sees three flocks of sheep clustered around a well capped with a large stone. At this point the narrative shifts from its usual narrative form with *wyyqtl* clauses to clauses with *wqtl* forms, as we are given the customary procedure of gathering the flocks together, rolling the stone from well, watering the sheep and replacing the stone on the well. Similar how-it-was-done procedures are found in Exodus 34:34–35, in I Samuel 2:12–31 (a series of three such discourses), in Judges 2:18–19, in II Kings 25:27–30, and even in Genesis 2:5b–6.

4. INSTRUCTIONAL. The classical example of this is the instructions for building the Tabernacle with its furnishings, making the garments for the priests, their ordination, and the institution of worship—all in Exodus 25–30:10, with breakdown into five constituent discourses (Longacre 1995). A shorter instructional discourse is found in Genesis 6:13–22—instructions to Noah for building the ark. While this discourse type has, again, a *wqtl* backbone, it has other features as well, e.g., the frequent use early in this discourse type of a topic-announcing imperative clause and/or a cleft sentence ('this # what you shall make/do') which specifies some of the detailed particular goals.

A further use of instructional discourse is to function as a mitigated form of hortatory discourse in which after an initial imperative the discourse gives way to *wqtl* forms rather than imperatives. See the speech of Joseph in Genesis 45:9–13. Here, Joseph, having revealed his identity as their brother, shifts from a barrage of imperative clauses to a form in which one imperative is followed by *wqtl*'s (Longacre 1989). Much of the book of Deuteronomy is given in instructional rather than in straightforward hortatory discourse—in spite of the dire caveats and warnings of the book.

5. *RIYB* (INDICTMENT/COMPLAINT). This discourse type evokes a courtroom-like atmosphere with indictment, cross-examination, and defense. Examples of it sometimes call inanimate objects: ('Hear, O heavens; give ear, O earth') as witnesses and make use of pseudo-dialogue and rhetorical questions. There are, however, two varieties of *riyb*: God's calling his people to account, and God's people complaining against him and attempting to bring God into the dock.

5.1. GOD'S INDICTMENT OF HIS PEOPLE. In this discourse type and in the lament (next section) the *qtl* form of the verb comes into its own as the predominating verb type, and often the backbone. But apparently what is intended here is some sort of past time reference. Consequently the *yqtl* can also figure in this discourse type in two functions: as past iterative, or as an old clause-initial preterite (i.e., clause-initial *yqtl*s which act to all intents and purposes as *wyyqtl*s). In principle, however, an indictment is not limited to past time reference but can involve *yqtl*s which accuse of present, ongoing activities, or more rarely verbless clauses which describe states.

As we might expect, the *riyb* is frequently encountered in the prophetic books, where, however, we typically encounter a collage of *riyb*, exhortation (hortatory discourse) and prediction. We find something like 'You've done despicably; repent and do good; blessing or judgment will follow on your response.' It's the 'You've done despicably' part that constitutes the *riyb*. I cite here as examples of *riyb* Isaiah 1:2–4 and 1:10–15, Jeremiah 2–3:5, Hosea 4, Amos 2:6–16, and Micah 6.

I comment here separately on Jeremiah 2–3:5, which is of special interest for both its length and its variety. This is a very lengthy *riyb* that contains various strands of information which basically consist of three elements: (1) denunciation, which consists of clauses with *qtl* verbs; (2) cross-examination, consisting of rhetorical questions and rhetorical commands; and (3) argumentation via clauses with *yqtl*. These do not indicate discrete areas of the discourse but are interwoven throughout it (cf. the interweaving of hortatory template elements in the Greek text of I John in Longacre 1983).

Denunciation is probably the basic element of this and other *riyb*'s in Jeremiah. Thus, in 2:6 and 8 the prophet denounces the people, priests, and rulers for not having even raised the question 'Where is Y.?', i.e., for leaving Y. out of account. In v. 2:13 the denunciation invokes a strong metaphor: 'My people have committed two evils: they've forsaken me, the fountain of living waters, to hew out for themselves cisterns, broken cisterns that can't hold water.' Such denunciation continues through 2:21 'You've turned into a corrupt vine'; 2:29 'You've all rebelled against me'; 2:30 'You've killed off your prophets'; 2:32 'You've forgotten me days without number'; 2:34 'On your skirts is found the blood of the innocent poor'; 3:1 'You've prostituted yourself, laid around with many lovers'; 3:3 'You've got a prostitute's forehead, and can't blush'; 3:5 'You talk piously and do all the evil you can.' The latter is a sequence structure consisting of a *qtl* clause followed by two *wyyqtl* clauses. In all these denunciations, clauses with *qtl* are found; they appear to constitute the backbone of the passage.

The denunciations are supported by two rhetorical devices, the rhetorical question (which either does not expect an answer or which contains a built-in, obvious answer), and the rhetorical command, which is a command to listen, stop, and consider, or on occasion an apostrophe to inanimate entities (e.g., the heavens in 2:12). I have lumped together the use of these two devices and likened them to cross-examination by a prosecutor. Rhetorical questions are found in 2:5, 14, 18, 21, 23, 28, 29, 31, 32; 3:1.

Rhetorical commands are found in 2:4, 9, 10, 12, 19, 23, 31; 3:2.

A typical rhetorical question is 2:5 'What fault did your fathers find in me?' A series of three rhetorical questions is found in 2:14: 'Is Israel a slave? Is he a houseborn

[slave]'; 'Why has he become a prey?' A pair of rhetorical questions is found in 2:18: 'What # to you as far as the way to Egypt, to drink the waters of Shihor?' 'And what # to you, as far as the way to Assyria to drink the waters of the River?'—a two-fold comment by the prophet on the fickleness and futility of Judah's foreign policy in the face of the Babylonian threat. In 2:21 a complaint is voiced in a two-fold rhetorical question: 'Have I been a desert to Israel or a land of great darkness? Why do my people say "We're through with you?"' In 2:32: 'Can a maid forget her jewelry or a bride her wedding ornaments?' And finally in 3:2, after the long hypothetical case of a man having put away his wife and her having become another's come the questions 'Should he return to her? Would not that land be greatly polluted?'

Rhetorical commands are to **hear** in 2:4, to **know** and **see** in 2:19, to **consider** in 2:21. In 2:9, 10 the rhetorical commands enjoin the hearers to travel on a supposed journey to Kittim or Kedar and see if a nation has ever changed its gods even though the gods are false. In 3:2 the rhetorical command is to **lift up your eyes** and **look** at the barren heights and **see** if there is any place where Israel has not lain with her lovers. In 2:12, the rhetorical command is an apostrophe to the heavens to be appalled at what Israel has done. I mention here again 2:19: 'Know therefore and see how evil it is to forsake Y. your God: and not my fear # in you'—as possibly central in the semantic structure of this whole discourse.

A third element is supporting argumentation, typically with *yqtl* clauses. This element may also occur in the form of a rhetorical question. Sometimes these passages outline, in effect, a metalanguage framework for the discourse. Thus, in two verses the verb *riyb* 'to bring charges, to indict' occurs. In 2:9 'Therefore I still bring charges against you, and I bring charges against your children's children.' In 2:29 occurs 'Why do you bring charges against me?' In 2:17 is the suggestion, 'Aren't you bringing this evil on yourself?' In 2:27 we find 'How can you say, "I'm not defiled?"' and a similar note in 2:35 'I'm about to enter into judgment with you because you say "I am innocent."' The continuing practice of Israel's national religion is acknowledged in 2:27 'Yet in time of trouble they say "come and save us."'

There are other *yqtl*'s which may not be functionally similar to those illustrated above; some of these indicate continued action as pictured in one of the similes/metaphors of the discourse: (1) 2:22 'Although you wash yourself with niter and use much soap...'; (2) 2:33 'How skilled you are in pursuing love.' Still other *yqtl*'s are *yqtl.p* i.e., past iterative: 2:3 'All who devoured him were held guilty. And disaster overtook them.' Clearly *yqtl*'s are polyfunctional in the *riyb* and the functions of the various usages must be distinguished.

The consecutive tenses figure here and there in this passage as well. Thus, in 2:5 two *wyyqtl*'s continue the sense and function of the preceding *qtl*. Somewhat differently three *wyyqtl*'s follow a somewhat contextually removed participle in 2:6, 7 with a change from third to first person as well. Furthermore the surface-structure sequence encodes here semantic counterexpectation. I reference here Longacre (1996:303–05) where phenomena of this sort are discussed. One lone *wyyqtl* occurs in 2:15 where it follows a *qtl* and precedes another *qtl*. Similarly in 2:20 a *wyyqtl* follows two *qtl*'s. Two

wyyqtl's follow a *qtl* in 3:1. Two *wqtl*'s follow a *yqtl.f/m* in 3:3, where a short procedural (and hypothetical) sequence paragraph occurs. Here, as in many other places and with various discourse types other than the discourse types in which *wyyqtl* and *wqtl* figure as backbone, the sequence structures which involves the consecutive tenses are strictly consecutive and characteristically brief.

5.2. GOD'S PEOPLE'S ATTEMPTS TO INDICT GOD. Many of Job's speeches in the book of Job could be construed as *riyb*'s of this sort. Job chapter 31 is, in some ways, the culmination of Job's defense. It consists for the most part of disavowals with accompanying self-imprecations: 'If I've done so-and-so, then let the following bad things happen to me.' Both *qtl*'s and *yqtl*'s with a past iterative reference are used in the protases of such disavowals, i.e., not only do we get clauses with *qtl*'s with the sense 'if I've done so-and-so' but we also find clauses with *yqtl*'s with the sense 'If on any occasions I've done so-and-so'. A climax of desperation is reached in vv. 35–37: 'Oh how I wish that there were someone listening to me! Here's my signature. Let the Almighty answer me! Let my accuser (the man of my *riyb*) put the charge in writing. Surely, I would carry it on my shoulder; I would tie it onto me like a crown. I would declare to him the number of my steps. Like a prince I would approach him!' A final disavowal is added in vv. 39–40.

Job here is in a defensive position. At the climax of the discourse he challenges God to put into writing whatever charge he has against him. Displaying this accusation he would strut proudly into God's presence. The passage includes a number of rhetorical questions and in general has a pseudo-dialogue cast.

Three other examples of attempting to call God to account are Psalms 44, 88, and 89. The latter two are the emotional and theological nadir of the Psalms and are positioned just before the upswing in Psalms 90, 91, and the 'Yahweh reigns' psalms. Psalm 89 begins with an affirmation of God's greatness and the establishment of his covenant with David, but shifts to a *riyb* in vv. 36–52 (v. 53 is closure of Book Three of the psalms and is not an integral part of Psalm 89). The *riyb* here accuses God of having broken the Davidic covenant. The accusation is expressed in clauses with *qtl*'s with perfect sense.

The somewhat similar psalm, Psalm 44, is likewise an accusation that God has forsaken his people whom he had formerly brought into the land and enabled them to possess it. There is a strong disavowal (cf. Job 31) of having fallen into idolatry or having in any way turned back from God—even though God has let many misfortunes befall them (vv. 18–23). This passage is for the most part characterized by *qtl*'s. But in vv. 10–15 earlier in the psalm particular indictments against God are given in clauses with old preterites, which I have labeled *yqtl.n*. Clauses with this construction are obligatorily verb initial just as are *wyyqtl*'s (the narrative consecutive tense).

Psalm 88 is a personal rather than a national *riyb*. It is almost unbroken complaint/expostulation with God—broken only by petition or reported petition in vv. 2–3, 10, and 14. The psalmist complains that he might as well be dead since God has so thoroughly abandoned him, and questions as to whether God expects the dead in Sheol

to praise him. The last word of the psalm is 'darkness'. The constructions for the most part are either *qtl* clauses or rhetorical questions with *yqtl*.

6. QINAH (LAMENT). This discourse type is, even more than the *riyb*, characterized by the predominance of *qtl* forms. Exceptions to the occurrence of *qtl*'s are the use of *wyyqtl*'s to continue the function and meaning of *qtl*'s, the use of rhetorical imperatives and *yqtl*'s in rhetorical questions, *yqtl*'s after negatives, and rarely *yqtl*'s with open-ended meaning, i.e., picturing a present (and unfortunate) situation.

The book of Lamentations is the most extensive lament (or series of laments) in the Hebrew Bible, with the lament structure overlaid with acrostic structure as a poetic device affecting the choice of initial consonants. As in the use of rime in European languages, we occasionally suspect that the choice of a given word or even occasionally of a grammatical construction is influenced by the demands of the acrostic pattern. For example a *yqtl*, the prefixal tense, may be selected if an initial *waw* or *tau* is desired. In such rare cases we might suspect that lexicon and grammar are influenced by phonological requirements. But even a quick scan of Lamentations—especially in a display with color coding of the Hebrew verb forms—reveals the overwhelming predominance of the *qtl*; exceptions are for the most part those mentioned above.

Other examples of the lament are scattered through the prophets, as in Ezekiel's lament for the prince of Tyre in 28:11–19. Often such laments occur in collage with prediction: 'I lament for you; God is going to bring the following judgments upon you.'

7. EXHORTATION/HORTATORY DISCOURSE. This discourse is defined by the predominance of command forms, i.e., imperatives and jussives (and more rarely, cohortatives). It is also defined by a template of the following elements: **authority of the exhorter**, the **situation** in which those commanded find themselves, the **command elements**, and **motivations** (warnings, promises, need). Joseph's speeches to his brothers as the forbidding viceroy of Egypt before he reveals himself are hortatory but later mitigated to instructional, after that revelation. The first nine chapters of Proverbs are extensive and well-developed examples of this discourse type. And there is no dearth of exhortation in the prophets. In many psalms which are dominated by command forms, hortatory discourse takes the form of prayer—often with additional template elements of **confidence** and **praise**. But hortatory discourse directed at one's fellow beings also occurs, often in the form of exhortation to praise God, but sometimes as exhortation to depart from evil.

8. EXPOSITION (INCLUDING DESCRIPTION). It is in this discourse type that the verbless (nominal) and the participial clause come into their own.

Some ten examples of expository paragraphs embedded in the Joseph story are cited in chapter four of that work in sections 2:4–3:5. In every case, the dominating Thesis is either a verbless clause or a participial clause—typically the former. Thus, as I observed in Longacre 1989 (and its 2003 revision), the dominating elements in

expository discourse are what we observe to be the most static elements in Narrative. It is as if the narrative scheme were turned on its head.

Genesis 42:13 is a good example of the fragmentary bits of exposition embedded in the Joseph story; the brothers explain their family to Joseph incognito (# symbolizes absence of verb).

Thesis 1: Expository Amplification para.

Thesis: 'Your twelve servants # brothers.

Amplification: We # sons of one man in the land of Caanan.

Thesis 2: And behold the younger # with his father today.

Thesis 3: And the one # none-of-him (= "And the other no longer exists.")'

In similar fashion Genesis 2:10–15 describes the rivers of Eden, while in Genesis 28:17 Jacob describes on awakening the place where he had slept as 'Beth-el,' and in Genesis 31:51–53 Laban explains why he is setting up the heap of stones. Exodus 25:10, 17, and 23 are typical of expository fragments embedded as specifications in the tabernacle-building procedures. For longer examples, see Ezekiel 40–48 (description of the eschatological temple and related matters), and Esther 1:6–7 (the splendor of the royal Persian banquet hall). The Ezekiel example employs a loose narrative framework which embeds shorter or longer stretches of description.

Psalms in which no command forms are found are usually expository—but overlaid with lyric features; cf. Psalm 23, 29, and many others. I also include the census reports of Numbers as a specialized use of this discourse type.

Insertion of *hayah* 'be' instead of # is a device by which a participant is not only described but presented; cf. Job 1:1–3.

9. SURFACE ELABORATIONS. In addition to the above there are further complexities occasioned by various surface structures. Most of these complexities are subsumable under three heads: lyric features, dialogue relations, and a distinction I make between 'trees' and 'forests'. Lyric features involve the tropes associated with poetry in many languages such as apostrophe, simile, metaphor, and metonymy—plus the use of the acrostic. Dialogue relations are as described in Longacre 1994, chapter 5. The distinction between 'trees' and 'forests' has to do with discourses which 'tree out' as a whole, versus the structures such as are found in law codes and Prov. 10 ff., where the discourse is a collection of mini-trees, each running through 1–4 verses. I call such collections 'forests'.

10. COMPLEMENTARITY OF VERB TYPE AND DISCOURSE TYPE. We have endeavored in the above sections to match verb types with discourse types. Thus, narrative is characterized by the *wyyqtl*; predictive, procedural, and instructional, by the *wqtl*—with the proviso that informal prediction is characterized by the *yqtl*, while special features, the topic-announcing imperative, and the cleft-sentence characterize instructional. Juridical discourse is not covered in this paper, but cf. Longacre 1994, where I suggest

that its basic structure is really *wqtl*, whose occurrence is frequently blocked by certain surface-structure features. The *qtl* is statistically predominant in the *riyb*, and perhaps even more so in the *qinah*. In expository discourse the verbless clause—subject to *hayah* ‘be’ insertion—and the participial clause predominate. In hortatory discourse—including prayer—imperatives and jussives predominate and constitute its backbone. (See summary chart at the end of this paper.)

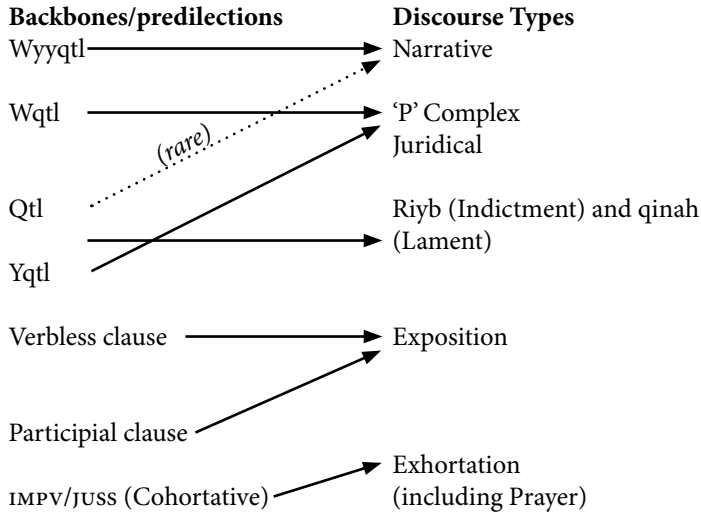
Moral: a language elaborates its verb system and its discourse structures together to the point where they properly invite joint consideration by the linguist—who is not flying off into the wild blue literary yonder when he insists that the discourse structure of a language needs to enter into the description of its verb system. An admirable start in this direction was made by Abangma (1987) in reference to the language Denya. Andrew Bowling and I are co-authoring a discourse-modular grammar of Biblical Hebrew of which the present article may be considered to be a summary and outline.

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A THEORY OF COMPLEMENTARITY: VERB/CLAUSE TYPES AND
DISCOURSE TYPES IN THE HEBREW BIBLE

A. BASIC COMPLEMENTARIES:



B. SURFACE ELABORATIONS

1. Lyric features
2. Dialogue relations [Job, Canticles, some Psalms, embedded in Narr]
3. 'Tree' vs. 'Forest' [Juridical, most of Proverbs]



LISTENING COMPREHENSION, LAWS, AND VIDEO

ALAN K. MELBY

Brigham Young University (BYU), Provo campus

THE ELECTRONIC FILM REVIEW (EFR) project at the Brigham Young University (BYU) Center for Language Studies uses feature films to support the improvement of listening comprehension in second language acquisition on the part of intermediate-level to advanced-level students. These feature films are major productions from the United States and other countries that have been released on DVD. The pedagogical basis of the EFR project is the assumption that interesting feature films can be effective in improving listening comprehension, but only with user control over the playback and with access to sufficient supplementary material to make the film comprehensible. The EFR approach provides this user control and access to supplementary material. Video materials on VHS tape and DVD have been used in the language classroom for years. However, the question has often been how to incorporate interesting video into a language-learning package. Not only is creating interesting original footage often very expensive and time-consuming, but, also, obtaining a derivative works license to use feature films is extremely difficult. The innovative feature of the EFR approach is a method of using DVDs that does not require a derivative works license.

The EFR project is currently 'treating', that is, developing Electronic Films Reviews, for two DVDs, one for English-as-a-Second language students and the other for Americans studying French. A preliminary EFR package has been demonstrated at several international events and has received a positive reception, both for its pedagogical approach and for its promotion of open standards for relevant data formats. The next step is trial use in the language classroom and computer lab, followed by evaluative studies of its effectiveness.

The paper will describe (1) the EFR system, (2) its pedagogical basis, (3) the intellectual property rights issues that have guided its design, (4) the films currently being treated, and (5) linguistic considerations in the design of the vocabulary helps in an EFR package. The central question in the present paper is how to develop a pedagogically sound language-learning package within the real-world constraints imposed by the use of feature films on DVD without a derivative-works license. Simply watching the films would not provide comprehensible input.

1. ABOUT THE EFR PROJECT. The basic technology used in the EFR project has many applications in education and training, but this paper will focus on its application to the listening comprehension aspect of second language acquisition.

The EFR project is currently aimed at students who have already studied the language in question for the equivalent of at least one year of university-level courses. It is assumed, therefore, that they have a rudimentary to basic reading knowledge of

the language and limited abilities in speaking and that they can understand carefully pronounced language when spoken by an instructor who has simplified the grammar and vocabulary of what is said. It is further assumed that they do not yet have the ability to fully understand a typical conversation between native speakers. This inability to fully understand typical native speech applies to both real-life situations and the soundtrack of a feature film. This approach is expected to apply to a fairly broad range of students, even though it is not intended for beginners. More advanced learners will need to use only a portion of the comprehension help provided by the system and will cover more minutes of a film in a given learning session, while intermediate-level learners will use more of the available help and cover fewer minutes of film in the same length session. The instructor can specify exactly which clips a student studies, or the student can work through the film in any desired order. The system is intended to support a number of teaching and learning styles for a broad range of students.

The EFR system under development is intended for use with off-the-shelf DVDs from major production studios. As already indicated, however, these films are not simply watched from beginning to end as if in a movie theater. Instead, they are played back in a customized manner using the EFR software. The EFR software can be used under instructor control in the classroom or under learner control in a computer laboratory or any other setting where the student has access to appropriate hardware and software. The hardware requirement is an Intel-type PC equipped with a DVD-ROM drive. The software requirements are Windows 98SE or more recent with Internet Explorer 6 or more recent, DirectX8, MSXML3, an approved software DVD player (currently, the only approved DVD player is WinDVD from Intervideo corporation), the EFR software, and an Electronic Film Review (an EFR). The EFR software being used in the project is licensed from PlayRight corporation, out of Alberta, Canada, and the PCs and DVDs are off-the-shelf items that are widely available.

The EFRs being developed segment the film into short clips and include extensive supplementary material for each of those clips. This supplementary material is called wraparound material. Wraparound material is commentary such as vocabulary notes, culture notes, and grammar notes. An EFR is a generation beyond traditional film reviews and commentaries. It is an XML file in a standard format that can either be presented for human viewing or processed by computer software. The EFR format is open and available for use by anyone.

The EFR system has been demonstrated at such venues as the DVD Summit in Dublin and the CALICO conference at UC Davis, both in March 2002, and at the international MPEG-7 awareness event in Fairfax, Virginia, in May 2002, and has received a positive reaction from professionals in the Computer-Assisted Language Learning and MPEG communities. The connection with the MPEG community is MPEG-7, a forthcoming international standard to describe various aspects of the content of a video asset (Manjunath, Salembier & Sikora 2002). An educational Video Asset Description format is being developed that will be compliant with both the IEEE-LOM meta-data specification (<http://ltsc.ieee.org/>) and the MPEG-7 standard. The EFR format will be adjusted as necessary to be compatible with the emerging Video Asset Description

standard. Although relevant to Computer-Assisted Language Learning system developers, we will not describe the details of the EFR format in this paper. Instead, we will turn to a description of the pedagogical basis of the EFR approach.

2. PEDAGOGICAL BASIS. The EFR project rests on the following three assumptions:

1. student success is strongly influenced by student interest, and student interest is increased by the use of stories in the form of interesting films with an audio track in the language being studied;
2. even if a film is interesting, simply watching it on VHS tape or DVD from start to finish without learning helps is not a very effective means of improving listening comprehension for an intermediate-level learner, since the learner likely does not understand much of what is being said and just stays lost, learning little; and
3. adding subtitles in the learner's language improves the benefits of watching foreign language films, and going even further, by enabling the learner to control the playback of the film and access clip-specific wraparound material as desired, further enhances the benefits of using films for improvement of listening comprehension. Adding wraparound material has the additional benefit of allowing comprehension without subtitles, thus further immersing the student in the foreign language.

The current section will comment on these three assumptions; however, the focus of the paper as a whole is not to argue the validity of these assumptions but rather to describe the pedagogical framework on which the EFR project is built and how it is constrained by intellectual property laws.

The pedagogical basis of the EFR approach is not claimed to be original. To the contrary, this section is intended to demonstrate that the EFR approach is consistent with current pedagogical theory and practice. Many language teachers around the world are using feature films on DVD as part their teaching strategy. The difficulty they are encountering is how to avoid copyright infringement as they attempt to (a) make it easier to play a given clip (smaller than a scene pre-defined on the DVD) over and over and (b) integrate wraparound material with the film in a package for use by individual students each working at their own pace on a personal computer.

The first assumption of the EFR approach is that films are a useful way to teach language. Today's language learners are mostly film watchers. They watch films in theaters, on television screens, and even on computer monitors. Their interest in feature films is a given. The importance of using authentic material in language learning has been demonstrated conclusively (see, for example, Schow 1998). The problem with films with an audio track in the language being studied is how to help students understand enough of the spoken language to get the gist of it. Although at some points in the history of language pedagogy it was believed that repeating authentic language was sufficient, with or without comprehension, current

pedagogical theory emphasizes the importance of 'comprehensible input' (Krashen 1982). Given a short video clip (typically under thirty seconds long) that the learner does not understand, some of the types of wraparound material that can be helpful in making the clip more comprehensible are: (a) vocabulary notes for key words and expressions in the audio portion of the clip; (b) culture notes to provide additional real-world knowledge about the significance of the actions and language in the clip; and (c) grammar notes organized using a communicative approach to show how a given discourse function is expressed by a particular grammatical construction used in the clip.

One advantage of DVDs over VHS tapes is that with films on DVD, the user can control the presentation of audio tracks and subtitles. This permits a number of possible approaches to viewing a film with and without subtitles and with various audio tracks.

Ryan (1998) suggests the following stages in the use of a film:

1. watching the film in its subtitled version,
2. watching the film without subtitles,
3. selecting a scene as the basis for role play,
4. making an audio recording of a student version of the scene,
5. and playing back the student audio recording while watching that video scene with the audio muted.

Peter and Barbara Lafford, in a presentation at the CALICO 2002 conference at UC Davis on the use of films on DVD in language learning, based their method on Olshtain and Cohen (1991), suggesting an alternative set of stages:

1. viewing a video clip without sound (observing paralinguistic cues),
2. viewing the clip with sound but without subtitles, and finally
3. viewing the film with both sound and subtitles.

The use of DVD in general, and the EFR approach in particular, allow the use of either of these methods and many variations on them.

The EFR approach is a particular instance of what has been called Customized Video Playback, which in turn is a type of Customized Multimedia Playback. An early instance of Customized Multimedia Playback was the practice of putting together a slideshow with a soundtrack by selecting which slides to put in the tray of the slide projector and which audio clips to record onto the tape that provides the soundtrack for the slideshow. Such customized slideshows have been produced by individuals for many years. An early form of wraparound material was the inclusion of footnote numbers in a language reading. The footnotes, which can be consulted as needed by the learner, contain explanations of potentially troublesome words, expressions, and cultural references. In the EFR approach, the instructor uses an electronic review of the film to facilitate the selection of clips on which the student is asked to focus. The playback of these selected clips is controlled by a video clip playlist. At any time during

playback, the user can pause the playback of the film and access the wraparound material that applies to the current clip. In addition, the user can navigate through the review and jump to any desired clip. This flexibility accommodates a number of teaching and learning styles.

3. INTELLECTUAL PROPERTY RIGHTS. When developing a system in which the user can customize the playback of the video, an issue arises concerning the video that is used. In order to maintain the interest of the learner, it should ideally exhibit high production standards for sets and actors, provide clearly recorded native spoken language, and follow an interesting story line. However, as already indicated, producing original footage that meets all these criteria is often prohibitively expensive. Three alternatives are being pursued at BYU: (1) enlisting the help of study-abroad students in filming interesting interactions among native speakers in foreign countries using a camcorder; (2) negotiating a derivative works license to feature films that meet the criteria; and (3) using interesting feature films on DVD in a manner that does not infringe copyright, so long as the DVD can legally be shown in the classroom and laboratory on a regular DVD player or a computer equipped with a software DVD player. In the United States, a standard license (obtained by purchasing a DVD at a retail store) is all that is needed so long as the film is relevant to the content of the course. In Canada, an extended license is needed for classroom viewing. This extended license is negotiated at the national level for most films. Legal requirements in other countries vary, but in most countries there is some way to show relevant films legally in the classroom.

The EFR approach uses the third alternative (DVDs with just a classroom license). Many educators are surprised to learn this and question whether such an approach can be legal. Therefore, we will briefly explain the legal theory behind the EFR project.

An important aspect of copyright law is the notion of a derivative work. In most countries, an individual can purchase a copyrighted work, such as a book or a VHS tape, and later resell it without consulting the copyright holder. However, the purchaser generally cannot modify the work and resell it or otherwise distribute it in its modified form (i.e., as a derivative work) without specific permission of the copyright holder. The original motivation for restrictions on the distribution of derivative works was to give, for example, a book author control over the stage play version of the book. If a pedagogical product is put together by copying and adapting substantial portions of a film (typically more than ten percent or more than three minutes, whichever is shorter), then the product is classified as a derivative work, and, therefore, a derivative works license is needed by the developer of the pedagogical product (CCUMC 1996). Typically, derivative works licenses are only available for older and less popular films. It is usually either prohibitively expensive or outright impossible to obtain a derivative works license for a recently released major motion picture. However, most of the films that are likely to hold the interest of a student are in this category.

In copyright law, it is understood that while the distribution of a derivative work is prohibited, the creation of a derivative work for personal use is clearly allowed. For example, every time you write in the margin of a book or cut out and re-arrange some

of its pages, you are technically creating a derivative work. However, no publisher is likely to attempt to prohibit the creation of such personal derivative works. Only the distribution of derivative works to the public is restricted.

In the EFR approach, what is distributed is not an alternative version of a film customized by a pre-defined playlist, which could possibly be considered to be a derivative work, even though the DVD is not physically modified, but instead a detailed review and commentary. It is the individual instructor who creates customized playlists as desired. In the case of an individual language learner using the EFR system without instructor supervision, the learner uses the system as an advanced software DVD player, with access to wraparound material upon demand.

Significantly, in the EFR approach the instructor and the student are not limited to three minutes of a film. The EFRs currently being developed segment a two-hour film into hundreds of manageable clips, grouped hierarchically into sub-scenes, scenes, and chapters.

A by-product of the EFR technology provides to users (instructors or students) the ability to avoid material they find personally offensive in a film. For example, a scene of graphic violence could be skipped over by removing it from a playlist, and foul language could be muted if the scene containing it is not skipped. The presence of offensive content in contemporary films is an issue of substantial concern in education (Gareis 1997).

The key claim of the EFR project, from the point of view of intellectual property law, is that an electronic film review, like all evaluative reviews and commentaries, is not a derivative work. Therefore, the distribution of EFRs does not constitute the distribution of derivative works. The user is expected to acquire a legal copy of the DVD through normal commercial channels. That DVD is not modified in any way, and none of the audiovisual material is copied or stored on any other medium. Even if customized playback under control of a playlist does constitute the creation of a derivative work, then creation and use of playlists is still legal in the context of the EFR approach since each playlist is created by an end-user rather than by the producer of the EFRs. Thus, if an instructor, laboratory, or individual has a license that allows the film to be viewed using a commercial DVD player, no extra license is required to customize the playback using an EFR specific to the film as a tool to personalize playlists. Sometimes, a tool can be ruled to be illegal if its sole purpose is to facilitate the commission of an illegal act, but in this case, an EFR is a tool that facilitates what is legal. The above is only the personal opinion of the author, not a formal legal opinion, and has not been tested in court.

This discussion does not touch on patent issues, which are also relevant. There are a number of granted and pending patents in the area of customized video playback, but they will not be discussed here, except to state that the only patent which may be infringed by the EFR approach has been licensed by the provider of the EFR software.

The core innovation in the EFR project is its methodology, which allows the use of feature films without requiring a derivative works license. To the knowledge of the authors, no other project is using precisely the same methodology as the EFR project.

The idea for the current EFR approach came to the author in the year 2000, after years of frustration at observing seemingly necessary choices between creation of expensive original footage and fruitless attempts at obtaining derivative works licenses. The author had participated in a customized video playback project that used expensive original footage and had subsequently worked on customized video playback of Hollywood films for several years but had not yet hit on the notion of using an electronic film review as the basis for easy creation of playlists by individuals. It is the distinction between an EFR (which is protected Free Speech, along with other forms of review and commentary) and a playlist, that both protects the EFR approach from legal challenge and provides flexibility for instructors to easily create their own playlists.

Only a period of use of the system in universities, colleges, and language schools will reveal whether the EFR approach attracts legal challenges and whether any challenges can be overcome. However, various discussions with intellectual property attorneys indicate that legal challenges are unlikely, especially in an educational environment.

4. CURRENT FILMS BEING TREATED. The development of an EFR for use in language pedagogy is a substantial task. Currently, BYU is treating two films: *October Sky* and *Chocolat*. The film *October Sky* is being treated for use in the English-as-a-Second-Language classroom and laboratory. The wraparound material for a given clip includes a mini-glossary of English words and multi-word expressions that might be troublesome to a non-native speaker of English. The film includes characters that speak dialects of English other than the rather uniform American English that is typically heard on a United States news broadcast. Thus, this film is appropriate for more advanced learners of English. It was chosen because it was already being used in the BYU English Language Center as part of the curriculum.

The next film to be treated for ESL will probably use a more standard dialect of English and be accessible to a less advanced learner.

The film *Chocolat* (the 2001 version with lead actors Juliette Binoche and Johnny Depp, not the older film with the same title) is being treated for use in a computer laboratory to supplement any textbook, whether the instructor chooses to use the film in the classroom or not. The lead actress is French; however, the primary language of the film is English. Although the DVD version of the film includes both English and French soundtracks, the obvious problem with using this film for French listening comprehension is that the French soundtrack is not perfectly synchronized with the lip movements of the actors, even though the dubbing is remarkably good in this respect. Some counterbalancing factors in favor of the choice of this film are:

1. the fact that it was filmed in France and illustrates aspects of French culture as it was in the 1960s,
2. the fact that it is easily accessible in the United States through many commercial channels,
3. the fact that it has English subtitles that can be turned on and off while the French soundtrack is active,

4. the fact that the film is quite 'watchable' (for most language students) even after two or three viewings, and
5. the fact that the French soundtrack is very clear and thus relatively easy to understand.

Hopefully, on balance, it was a good selection. Depending on instructor preferences, the student of French might first watch the entire film with French audio and no subtitles, or with English audio to get the storyline, or in French with English subtitles. Whatever the details of the method, at some point the student begins in earnest to attempt to understand the French dialogue, using the wraparound material as needed. The first watch-through with English audio or English subtitles provides an overview of the story so that from then on, each clip is studied in context. This context, in addition to access to the optional wraparound material, is important in obtaining comprehensible input (Omaggio-Hadley 1993).

The next film to be treated for foreign language study will probably be a film whose primary audio track is in the language being studied.

5. DESIGN OF VOCABULARY HELPS. It is already known that the use of feature films not consciously designed for language instruction is in some ways not ideal (for example, the vocabulary is not controlled), and it is painfully obvious that following guidelines that eliminate the need for a derivative works license imposes a number of constraints on the pedagogical design. It remains to be seen how the effectiveness of an EFR package will compare with the effectiveness of using original footage or third-party footage with a derivative works license. However, studies such as the Schow study already cited provide encouragement for the use of authentic materials despite the un-controlled nature of the vocabulary.

One particularly important constraint imposed by the EFR approach is that an EFR package distributed to language teachers cannot make available a transcript created by the EFR authors. This is not a particular problem if the DVD includes a subtitle track for the language being studied, since subtitle tracks burned onto a DVD are effectively transcripts of the film. However, in the case of *Chocolat*, the DVD includes both English and French soundtracks but only an English subtitle track. In order to compensate for the lack of a French subtitle track, extensive vocabulary helps have been developed. The instructional designer first identifies all the words and multi-word expressions in each clip of the film's French audio track. Then the designer categorizes these words and expressions into three classes: (1) stop words (such as articles and prepositions), (2) old terms that the learner is expected to already be familiar with, and (3) new terms that the learner is not expected to know. We use *term* to refer to either a word or a multiword expression and to emphasize the concept orientation of the approach. The focus is on helping the learner acquire new concepts in the context of the film, not just memorize lists of words. The 'old' and 'new' terms are then each alphabetized and made available to the learner when the corresponding clip is displayed. The display of these two lists does not violate copyright as would the display of a transcript

not on the DVD, and these lists make a clip more comprehensible to the learner. An important consequence of having lists of terms for the student to listen for is that it takes advantage of the well-known 'word-spotting' effect. Anyone can better hear a word in a stream of spoken language if the word is given in advance.

The terms in the list of supposedly new terms are each linked to a simple webpage that contains a concept-oriented dictionary entry. Initial attempts at vocabulary helps used traditional lexicographical style dictionary entries. These entries were rejected for the purposes of the EFR project, since the definitions were often more difficult for the learner to understand than the term being defined. General, abstract definitions as typically found in monolingual dictionaries may be useful for advanced learners of a language, but are not nearly as useful to novice and intermediate learners. Therefore, it was decided to use explanations that are very specific to the meaning of the term in the particular film clip at hand. This distinction between general and specific definitions has implications for the way we learn language and is probably worthy of a research project focused just on how to write monolingual vocabulary helps for various levels of learners.

Another issue is whether to include glosses in the language of the learner. For the *Chocolat* package, the issue is whether to include English glosses of the French terms. It is widely assumed among language teachers that it is beneficial for a language learner to stay in the language being studied as much as possible and to avoid switching back and forth through the use of bilingual dictionaries. However, there does not seem to be consensus on why this is important. Three factors that have been suggested as relevant are: (1) the distinction between declarative and procedural memory, (2) the distinction between explicit and implicit knowledge, and (3) the distinction between integrated knowledge and indirect knowledge. See Wilkes (1997:94–96) for an explanation of the declarative/procedural distinction and (1997:153–55) for an explanation of the explicit/implicit distinction, which are sometimes equated but may not be identical. The integrated/indirect distinction is not a standard one but is meant here to refer to the issue of whether a newly learned vocabulary item is linked directly to a node in the learner's conceptual system or linked indirectly through association with a term in another language.

Lamb suggests that the lack of fluency usually observed in the use of a language learned in school might be explained if much of the linguistic knowledge that a child learning a language stores in procedural memory is instead stored in declarative memory. 'That difference is directly correlated with the great skill and fluency of people using their native languages as opposed to the clumsiness with which they attempt to navigate their way in a foreign country with the aid of school-taught second language' (Lamb 1999:298). If the Lamb model applies to vocabulary acquisition, then perhaps staying within the language being learned could contribute to an increase in procedural knowledge about the language being studied.

Explicit knowledge is more consciously accessible than implicit knowledge. Mor-timer (2000:165) cites a study that indicates more use of explicit knowledge during use of a person's second language than during the use of that person's first language. If

- term: saoul/soûl (drunk)
- In the *Larousse de Poche*:
 - (synonym): ivre
 - (litterary): être soûl de quelque chose : en être rassasié jusqu'au dégoût
 - (familiar): tout son soûl: autant qu'on veut: dormir tout son soûl
- In the *Chocolat* vocabulary help:
 - Saoul (Adjectif): Quand on boit trop d'alcool, on devient saoul

Figure 1. *Alternative approaches to vocabulary helps.*

this study is relevant to vocabulary acquisition, then perhaps staying in the language being learned contributes to the storage of vocabulary as implicit rather than explicit knowledge.

Suppose that a new term could be learned either by integrating it into the network of terms and associating it directly with a concept in the learner's conceptual system or by linking it to a native-language term that is then linked to the learner's conceptual system. The indirect learning would seem to have two disadvantages: (1) the two terms may not be completely equivalent, and (2) the indirect nature of the learning may slow down language processing in conversation by requiring the language learner to be constantly switching between languages. If this distinction is mentally realistic, then staying within the language being learned could contribute to an increase in integrated knowledge.

Regardless of whether any of the above explanations are accurate, it has been decided in the *Chocolat* package to encourage the learner to stay within the language being learned by providing only French monolingual explanations of a term unless the learner explicitly asks for an English gloss. At some point, it may be decided to allow the instructor to turn the availability of an English gloss on or off.

Figure 1 shows the contrast between dictionary definitions for a French word meaning 'drunk' (those dictionary definitions consisting of synonyms that are probably not known to an intermediate learner and literary and idiomatic usages that do not apply to the use of the term in the film, in clip 10-1C1—chapter 10, scene 1, sub-scene c, clip1, to be precise) and a context-specific explanation.

Another approach to vocabulary helps, particularly applicable to concrete nouns, is to use images in the explanations. This approach is helpful, for example, to explain the French term *ceinture* (belt).

As of the summer of 2002, the future of the EFR approach appears sufficiently promising to justify the development of additional applications while the two initial applications are being tested in the classroom. Future papers will report on the experience of using EFR packages in real-life language learning classrooms and laboratories and on experiments designed to measure their effectiveness.

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SOCIAL STRATIFICATION OF [fifti] IN TOLEDO DEPARTMENT STORES

JANELLE METZGER
University of Toledo

BASED ON LABOV'S STUDY OF SOCIAL STRATIFICATION¹ in New York department stores, this study compares articulation of *fifty*: [fifti] and [fiti], with socially stratified stores. Age, race, and sex are also taken into account as possible confounding variables. The strongest correlation occurs between the store and response. Weaknesses of the study are discussed and further research is suggested to verify the results.

1. INTRODUCTION. Since the time of Labov's foundational study (Labov 1972) in New York City department stores, much linguistic research has continued on the subject of social stratification based on various articulations in a localized area. The ideas of rapid and anonymous data collection and studying subjects in their workplace have proven to be useful methods for research. It is interesting to note that, according to a study of travel agency talk (Coupland 1981), employees often show substantial phonological convergence in speech with their clients. Therefore, it seems that department store employees will take on a corporate-type speech that will conform to that of their cliental, mimicking their social status. Wolfram (1969) made the point that social class is the single most important factor accounting for speech differences in his study of Detroit Negroes. Crane (1973a, 1973b) and Powers (1982) gave further examples of such class determination according to various articulations. Furthermore, the significance of studying linguistic behavior in a work setting is underlined by Tway (1976) in her article on social stratification and linguistic correlates of factory workers.

In a comparative study, Dorian (1994) suggests that variation of articulation among speakers in a small community may show no social, age, gender or minority stratification at all. Because Toledo, Ohio is much less isolated than fishing communities of East Sutherland, Scotland, however, it was supposed that such a similarity of results would not be found in this community.

It is also worthy to note that findings (Gordon 1994) have proven women to style shift more dramatically than men, and that they tend to choose more prestige variants in formal situations. For this reason, the gender of each subject was recorded for analysis.

Upon consideration of Labov's study (Labov 1972), our team began discussion of possible variables for stratification in Toledo stores. Several options were considered, each with varying levels of difficulty in the data collection procedures. Interestingly enough, it was an interview with the researcher's nephew ("Tony") that sparked the idea to examine the articulation of [fifti] in Toledo department stores.

Tony is a white, middle-class honors student at a nearby small-town university (BGSU), where, according to the Bowling Green State University Provost, the minority population is ten percent of 18,000 students. He recently graduated from Anthony Wayne public high school, which includes a minority community of less than two percent out of an entire 1150 student population. During the interview, he claimed that it was very common among his coworkers at Burger King (himself included), to use the articulation [fɪtɪ] in linkages with customers. When asked about the influence of African American English Vernacular (AAEV) on this particular articulation, he asserted that he and his coworkers had little interaction with the African American community and therefore little influence from it regarding their speech patterns.

Upon testing the idea in a few department stores, it seemed that it perhaps had some merit. Data could be easily collected, using the rapid and anonymous technique. The response was relatively easy to elicit and the articulation differences did not appear to fall along racial lines. A research hypothesis was thus formed: If any two subgroups of Toledo, Ohio speakers are ranked in a scale of social stratification, then they will be ranked in the same order by their differential use of the articulation (or lack thereof) of the second [f] in [fɪtɪ].

The three stores selected for study were Jacobson's, Kohl's, and Value City. Their ranking may be illustrated in various ways.

First of all, there is location. Jacobson's is located in the Franklin Park Mall, the nicest and preferred mall in Toledo. Kohl's is located just down the street from the same mall, in a slightly cheaper rent area, while Value City is located away from major shopping centers, in a cheap rent district.

Secondly, we look at advertising. Value City has a four-page insert in the Sunday paper. It is printed on low quality newsprint with maximum use of space, covering several items and departments on each page. There is no cover page on the insert. Kohl's advertises higher quality items at a cheaper price. They too, have an insert in the Sunday paper. It is a thirty-five page, glossy print magazine-type ad complete with cover page. Jacobson's, on the other hand, rarely advertises. Most of their publicity comes from personal phone calls to their preferred clientele.

Finally, consider pricing. Men's winter coats at Value City range in price from \$29.99 to \$59.99. At Kohl's, they range from \$29.99 to \$224.99.

Jacobson's rounds all their coats to the nearest dollar and they range from \$79.00 to \$850.00.

From these examples, we can clearly see that Jacobson's sits at the top of the social structure of Toledo Department stores. Kohl's is mid-range, and Value City is on the bottom.

The dependent variable in question is the articulation (or lack thereof) of the second [f] in [fɪtɪ]. Casual and emphatic responses were solicited from subjects. The replies were then categorized as 'all [f]', 'some [f]', or 'no [f]'.

Several possible confounding variables were taken into consideration. These include race, gender and age. Of relevance here is a previous study done examining the race of the interviewer (Cukor-Avila & Bailey 2001). Although they suggest that

properties of the interviewer can influence the data collected, they equally prove that familiarity appears to have a greater effect. Again, the use of rapid and anonymous techniques in a fairly scripted linkage greatly reduces the familiarity factor and maintains a consistent interaction, therefore greatly reducing such bias.

Given the previous background, the hypothesis in the current study predicts the following result: when asked to read the number 50 in Toledo Department stores, salespeople in the highest-ranked stores will have the highest occurrence of [f] in coda position in [fifti]. Those in the middle-ranked store will have intermediate values of [f]; and those in the lowest-ranked store will show the fewest number of occurrences as displayed on a spectrograph.

2. DATA AND DATA COLLECTION METHOD. Data collection was done by a team of five researchers. The team is a diverse group of males, females, native and non-native English speakers. There are no native AAEV speakers among the researchers. The researcher entered the store or department and found an item with the number '50' in the price or '50 percent off'. The researcher then asked the subject the price or percentage off on the item. After receiving the first response (casual) the researcher asked the subject to repeat the number (emphatic). The procedure was not standardized beyond these directives; the only standardized and consistent part of every linkage was text prop element '50'. All linkages were tape recorded covertly. Researchers noted their perception of race, gender and age of the subject at the time of data collection. It is understood, however that a margin of error exists with this method. The predicted lowest level of reliability will be age factor, followed by race, with gender being the most reliable perception.

Tape recording was done in compliance with the University of Toledo's policy and standards for protection of human subjects in research and investigational activities. According to these standards, this research qualified under two exemption categories:

1. Projects involving survey or interview procedures, except where [a, b, or c (below) conditions] exist, and
2. Projects involving observation of public behavior, except where any of the following conditions exist:
 - a. observations are recorded so that individual persons may be identified, directly or through identifiers, or
 - b. the observations if they became known outside of the project, could reasonably place the person at risk of criminal or civil liability, or be damaging to the person's financial standing or employability, or
 - c. the project deals with sensitive aspects of personal behavior, such as illegal conduct, drug use, sexual behavior, or use of alcohol.

3. RESULTS. A total of 61 subjects gave casual responses, 4 of these were disqualified because of lack of clarity on the recording. An additional 26 were eliminated because

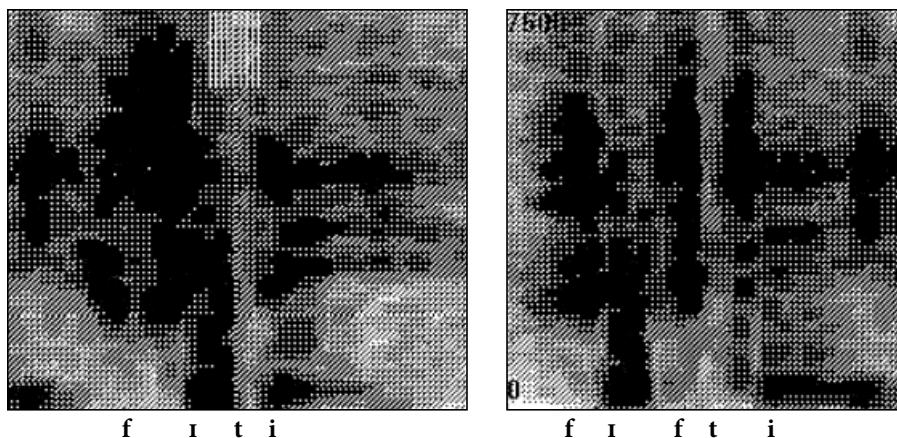


Figure 1. Examples of spectrogram readout.

there was no emphatic response recorded for that subject. The remaining 31 subjects each had two responses, casual and emphatic, resulting in a total of 62 responses.

Response type ([f] or no [f] in casual and emphatic) was identified by consensus of independent votes of the five researchers. It was agreed upon that an eighty percent level of consensus would be required in order for a sample to be categorized, if the response lacked that level of consensus, it was then subjected to spectrogram analysis. Spectrograms, such as that shown in Figure 1, were independently read and scored by two separate researchers before being entered into the database.

In Figure 1 one can clearly see the difference in articulation of [fiti] and [fifti]. The dark patches on the bottom of the readout represent sound waves produced by the two (vowel) articulations [i] and [i] respectively. In the first sample, there is a vertical white area in between the two low dark patches that represents the voiceless [t] articulation. This full voiceless closure shuts off sound across the whole low-to-high range. In the second sample there are two distinct white vertical sections between the two low dark (vowel) patches representing the two distinct voiceless articulations, [f] (a high frequency 'white noise' with little energy in low frequencies) and then [t].

Raw data (Figure 2) shows an occurrence of 22/22 (100%) response type [f] at Jacobson's, 10/14 (71%) at Kohl's and 10/16 (62%) at Value City.

4. DISCUSSION AND CONCLUSIONS. Statistical analysis (χ^2) was performed on the 62 responses comparing them with store, sex, race, and age. A strong correlation ($p = .005$) was found for store/ response type. One cell in the analysis showed an expected frequency value of <5, (16.7% of the total cells). Conservative statisticians suggest that no cell values should be <5, but some make allowance if the number of cells containing expected frequencies < 5 is less than twenty percent. However, for absolute certainty in this study, more research should be done incorporating a greater number of subjects.

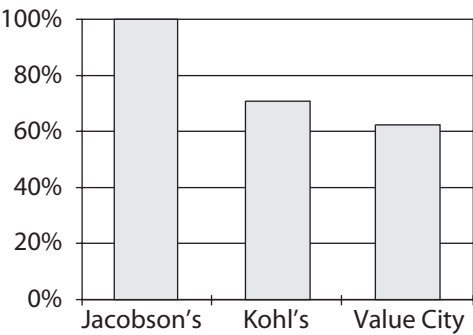


Figure 2. Percentage of [f] response by store.

		No [f]	yes [f]	Row Total
Jacobson's	Observed frequency	0	22	22
	Percentage of Table	0.00%	35.48%	35.48%
	Expected Frequency	4.97	17.03	
Kohl's	Observed frequency	4	10	14
	Percentage of Table	6.45%	16.13%	22.58%
	Expected Frequency	3.16	10.84	
Value City	Observed frequency	10	16	26
	Percentage of Table	16.13%	25.01%	41.94%
	Expected Frequency	5.87	20.13	
Column Total		14	48	62
		22.58%	77.42%	100%

χ^2 Test:	χ^2	Df	p-Value (< .01)	Warning: some cell counts < 5.
	10.45	2	0.0054	

Table 1. Frequency table and χ^2 test for store by response.

Tables 1–3 show the results of comparison between the response type and other variables (store, age and sex) that showed possible correlations. The first section of each is a chart that displays observed frequency, percentage of table, and expected frequency. The second is a χ^2 inferential statistic displaying probability of correlation between the two variables. The p-Value is the critical number and should follow the suggested number value listed in parenthesis next to the word p-Value. The greater

		No [f]	yes [f]	Row Total
Ages 15-29	Observed frequency	4	8	12
	Percentage of Table	7.14%	14.29%	21.43%
	Expected Frequency	3.00	9.00	
Ages 30-49	Observed frequency	2	24	26
	Percentage of Table	3.57%	42.86%	46.86%
	Expected Frequency	6.50	19.50	
Ages 50-69	Observed frequency	8	10	18
	Percentage of Table	14.29%	17.86%	32.14%
	Expected Frequency	4.50	13.50	
Column Total		14	42	56
		25.00%	75.00%	100%

χ^2 Test:	χ^2	Df	p-Value (< .05)	Warning: some cell counts < 5.
	8.23	2	0.0163	

Table 2. Frequency table and χ^2 test for age by response.

the difference between the suggested p-Value and the actual p-Value, the greater the certainty of the result.

There was no apparent correlation between race and response and a small, unreliable correlation between sex and response. Of interest is the possible correlation of age to response ($p = .01$). I say possible, because the process of obtaining the age of the subject was highly subjective. Due to the rapid and anonymous collection method, it was not possible to ask the subject his or her age. It appears that the highest frequency of [fiti] occurs in the 50-69-age bracket, next is the 10-29, with extremely low frequency in the 30-49-age bracket. Because 33% of the cells have an expected frequency of <5, the χ^2 test is not considered to be reliable in this condition, so further study is recommended.

The results of the sex by response test were unreliable for several reasons. First of all 25% of the cells had an expected frequency value of < 5. Secondly, when Yates' correction is applied (because it is a 2×2 table), a $p \leq 0.10$ result is 'strongly suggestive' but not conclusive by any standard. Furthermore, the Fisher's exact test (used to check for correlations between two nominal level variables and is less vulnerable to distortion in small samples than the χ^2), produced a p-Value of > 0.05 but < 0.10 which is again strongly suggestive, but not a conclusive certainty of result.

		No [f]	yes [f]	Row Total
Female	Observed frequency	14	34	48
	Percentage of Table	23.33%	56.67%	80.00%
	Expected Frequency	11.20	36.80	
Male	Observed frequency	0	12	12
	Percentage of Table	0.00%	20.00%	20.00%
	Expected Frequency	2.80	9.20	
Column Total		14	46	60
		23.33%	76.67%	100%

χ^2 Test:	χ^2	Df	p-Value (< .10)	Warning: some cell counts < 5.
	4.57	1	0.0326	
	3.08	1	0.0792 (with Yate's correction)	

Fisher's Exact Test for 2 by 2 Tables
(p-Value <0.10):

One-tailed P-value	0.27806
Two-tailed P-value	0.0516416

Table 3. Frequency table for sex by response.

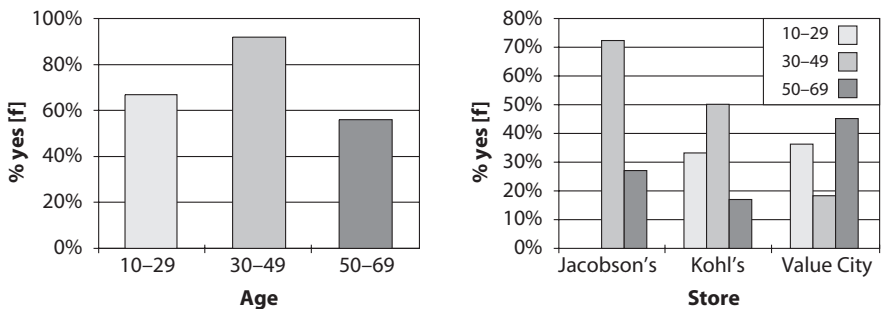


Figure 3. Age compared to occurrence of [f] and store.

Of particular interest is the correlation between subject's age and store. χ^2 results gave a p-Value of 0.0018 for this correlation when a value of < 0.01 was suggested. However, more than twenty percent of the cells had an expected frequency < 5, so we cannot consider the results reliable. A quick scan of the charts above does raise several questions in terms of possible correlations.

4.1. POSSIBLE BIAS FACTORS. Because the researchers have diverse properties, the possibility for bias according to subjects' reactions to a certain gender, age, race, or native language are spread out and greatly reduced. However, this advantage causes the collection procedure to be slightly less regular. The personality, gender, and other properties of the researcher obviously affected the manner in which questions were asked and may have unconsciously affected the type of response. Based on the study of researcher properties and bias (Cuker-Avila & Bailey, 2001), and the fact that data was collected with virtually no familiarity between the research and the subject, it is the opinion of this researcher that the advantages in this case outweigh the disadvantages.

Another advantage of this method is the use of the rapid and anonymous technique. In this way, the subject is unaware of the research situation and more likely to perform in his usual manner. Recording further increased validity especially with spectrograph analysis for sorting out discrepancies. However, the rapid and anonymous technique disallowed the researcher asking questions of the subject, such as his or her age, which greatly diminishes the reliability of the reported age.

Another possible weakness of the study is the time frame of the collection. Because the collection of data took place over an entire week, it is possible (though only remotely), that some of the samples could actually be doubles of the same subject. Since the researchers were aware of this pitfall, they tried to do collections at different locations of the same chain wherever possible. Because Jacobson's has only one location, however, it is especially vulnerable to double data collection. In order to minimize this possibility, researchers collected at different times of day. For example, one researcher collected data between 10am and 5pm. (Several employees stated this as their normal schedule). The other researcher collected after 5pm. Based on these restrictions, the possibility of a double sample although present, seems highly unlikely.

4.2. CONCLUSION. In conclusion, preliminary data show a strong correlation between store stratification and response, as well as a possible correlation between age and response as well as age and store. The evidence so far raises more questions than it answers. Do the mentioned department stores have hiring practices based on age or linguistic variation? If age and linguistic variation were studied independently of social stratification would one find the same correlations? Why is there an apparent generational gap in the articulation of [fɪfti], with the middle range showing the highest occurrence of [f] and the oldest the lowest, followed by the youngest? For conclusive evidence, further studies should be done, involving a greater number of subjects and separating the variables of age and social stratification.

¹ Special thanks to Ryan Kowalski, Tao Jiang, Mackenzie West, and Shane Watkins for their help with data collection and analysis, and to Douglas W. Coleman for his guidance in this project.

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ZERO ANAPHORA AND REFERENTIAL SALIENCE IN CHINESE DISCOURSE

YILI SHI

Southwest Missouri State University

IN CHINESE ONE TYPE OF PRONOUN need not be specified with any lexical item and is therefore called zero pronoun. Zero pronoun is a widespread phenomenon in Chinese and can be used to refer to virtually any NPs and even things that are not explicitly mentioned in the discourse.

In this study¹, I show the distribution of zero pronouns in discourse based on a study of approximately 68,000 words of Chinese from a variety of spoken² and written Chinese³ (see Biber 1986). I have used Gundel, Hedberg and Zacharski's (1993) cognitive status in the Givenness Hierarchy to record the distribution of 1905 tokens of zero pronouns. Most of them occur under the category of 'In Focus'⁴ and 'Activated', with 65 tokens under 'Type Identifiable' (see Table 1, overleaf). It is not surprising to note that zero pronouns are used for completely different reasons. On the one hand, they are used to refer to highly focused entities, entities that are so taken for granted that an overt marker is rendered unnecessary; on the other hand, they are used to refer to general entities whose referential salience is so minor that an overt maker is unnecessary.

I first show examples where zero pronouns are used to encode highly focused and highly activated discourse entities, for example, speech participants in a conversation. I show counterexamples to the conjoinability constraint hypothesis proposed by Chen (1984) and Li and Thompson (1979) and argue that the condition governing the use of zero pronouns is the attention status of an entity. Second, I argue that the non-occurrence of zero pronouns, when all necessary conditions for their occurrence are met, is due to the fact that a pronoun and a full NP can highlight the referential salience of an important entity better than a zero pronoun can. Third, I argue that the use of zero pronouns to refer to type-identifiable entities signals minor referential salience.

1. ZERO PRONOUN AND SPEECH PARTICIPANTS. In conversation, the speaker and the recipient are automatically activated, and in the Chinese conversations recorded for this study, zero pronouns are frequently used to refer to speech participants. Consider example (1):

- (1) A: *Women zhengzheng paole shi'er ge xiaoshi.*
we entire be-away-PFV twelve CL hour
'We have been running around for an entire twelve hours.'
B: *Yitian.*
one-day
'One day.'

	In Focus	Activated	Familiar	Unique	Refer- ential	Type Iden- tifiable	Row Totals
∅	1302 68%	531 28%	2 0.1%	5 0.3%		65 3%	1905 100%

Table 1. Distribution of zero pronouns (approximately 68,000 words studied).

- (1) A: *Ni xiang me*, (a) *∅ zhaoshang liu dian..* (b) *∅ zaoshang liu dian*
you see MAUX morning six o'clock morning six o'clock
yike zou me, (c) *∅ jinjia ye shi liu dian yike, ganggang*
quarter leave MAUX enter-home too is six o'clock quarter just
shi'er ge xiaoshi. Zhe yi lu hai bu cuo, jintian tianqi hai keyi.
twelve CL hour this one trip still not bad today weather still quite-good
'You see, (I) left home at six o'clock this morning.. a quarter past six this
morning, and (I) returned home at quarter past six. Exactly twelve hours.
The whole trip wasn't bad at all and the weather was quite good.' (Conver-
sation PC)

The zero pronouns in NP (a), (b), and (c) refer to the speaker himself in the conver-
sation. Thus, *wo* 'I' is omitted and considered unnecessary, because the immediate
speech situation allows the addressee to identify the referent. The use of zero pro-
nouns to refer to *I* and *you* is common in Chinese conversation. Now consider (2),
taken from a conversation between a nine-year-old girl and her parents:

- (2) Child: *Mama.*
Mom
'Mom.'
Dad: *Nannan, women zai zher.*
Nannan, we at here
'Nannan, we are here.'
Mom: (a) *∅ Zenmele?*
what-is-wrong?
'(You) need any help?'
Child: *Mama, (b) ∅ re.*
mom hot
'Mom, (I am feeling) hot.'
Mom: (c) *∅ re a? na* (d) *∅ ba kongtiao kaikai.*
hot Interj. then BA air-conditioner open
'(Are you) hot? Then (I'll) turn on the air-conditioner.'
Dad: (e) *∅ kongtiao kaikai le.*
air-conditioner open PFV
'(I) turned it on already.' (Conversation KZ)

NP (a) refers to *ni* 'you'. The mother is addressing the daughter, but instead of using *ni* 'you', she uses the zero pronoun. NP (b) refers to *wo* 'I'. The daughter is talking to her mother and she uses the zero pronoun to refer to herself, the speaker. When the daughter says: *Mama, re* 'Mom, hot', it is not interpreted as *Mom is hot*, but rather *Mom, I'm hot*. The immediate speech situation allows the mother to identify the referent of a zero pronoun as referring to the daughter herself. Consider the use of zero pronouns in NP (c) and (d). NP (c) refers to the daughter, the addressee, and NP (d) refers to the mother, the speaker. Finally, the father uses the zero pronoun in (e) to refer to *wo* 'I'.

The use of zero pronouns to refer to the speaker him/herself is also found in letters as in (3), taken from a published letter in a health column in *People's Daily*:

- (3) *Feng daifu*:
Feng doctor:

Nin hao, (a) \emptyset *chuguo* *liu nian*, *Renmin Rebao Haiwaiban*
you good leave-country six year People's Daily Overseas-Edition

ye ban *wo liu nian*, (b) \emptyset *gei nin xiexin* *de niantou*
too accompany me six year give you write-letter NOM intention

yi you le si wu nian, (c) \emptyset *meici* *bingshi* (d) \emptyset
already have PFV four five years every-time sick-moment

tingzhe, (e) \emptyset *bing hao le ren you mei juexin* *le*.
endure-DUR sickness good PFV person again not determination PFV

Doctor Feng:

How are you? (I) have been away from the country for six years and the *People's Daily* Overseas Edition has accompanied me for six years, too. It has been four or five years since (I) wanted to write a letter to you, but every time (I) was sick (I) endured it, and when (I) got better, I could not make up my mind (to write to you) again. (*People's Daily* 6/14/1996)

In (3), at the very beginning of the letter, the zero pronoun is used in NP (a) to refer to the writer herself. Subsequently, four zero pronouns are used to continue to refer to the writer, suggesting that speech participants are automatically activated and thus their referential identity is not at issue.

As we can see, since speech participants are so taken for granted in the speech event, zero pronouns are used frequently and as a result more attention seems to be drawn to what the speaker has to say.

2. SOME COUNTEREXAMPLES TO THE CONJOINABILITY HYPOTHESIS. Li and Thompson (1979) and Chen (1984) claim that the occurrence of third person zero pronouns is

conditioned by conjoinability factors. The following factors are said to affect conjoinability (Chen 1984:10), and therefore require an overt pronoun or an NP:

1. Turning from foreground information to background information, or vice versa; or turning to something downright unexpected from what has been established before.
2. Insertion of some digression into the theme development.
3. Insertion of temporal, locative, adversive adverbials, or other types of adverbials.
4. Pauses, or hesitation, especially when the theme tends to become longer and longer.
5. Paragraph boundary.
6. Switch or turn in conversation, and so on.

Conjoinability is a very important factor in explaining a majority of pronoun uses. However, as Li and Thompson (1979) note, conjoinability is not a rule which can predict the choices between a zero pronoun and an overt pronoun. There are still examples that cannot be accounted for by the conjoinability principle. In this section, I will show a number of counterexamples and suggest that the state of attention of an entity is the conditioning factor that governs the choices between zero pronouns and overt pronouns or full NPs.

Consider example (4), taken from a news report:

- (4). *Jinnian ershi liu sui de* (a) *Li Duihong laizi*
 this-year twenty six year-old NOM Duihong Li come-from
woguo shiyou cheng daqing, 0 congshi sheji yundong
 our-country petroleum city Daqing engage-in shooting sports
shisi nian, guoji bisai zhong 0 jinpai na
 fourteen year international competition during gold-medal take
le yidaba, dan (b) 0 jiushi meiyou na guo Aoyunhui
 PFV one-big-bunch but precisely no-have take EXP Olympic
de jinpai, 0 na guo shijie guanjun.
 ASSOC gold-medal take EXP world champion

'Duihong Li, twenty-six this year, is from our country's petroleum city, Daqing. (She) has engaged in shooting sports for fourteen years. In international competitions, (she) has won a lot of gold medals, but (she) had not won any Olympic gold medals, although (she) had already won a world championship.' (News from the Eastern Broadcast 7/27/1996)

The character *Li Duihong* is first introduced in NP (a) in 4. Afterwards, two consecutive zero pronouns are used to form a topic chain. Consider the use of the zero pronoun in NP (b). The adverb *dan* 'but' occurs in sentence initial position. It is said to signal a change in the theme development. However, the zero pronoun continues to be used to refer to the topic, thus suggesting that when the topic is in the current focus of attention, the zero pronoun can be used in spite of the conjoinability constraint.

Consider example (5), taken from a conversation between two friends. I argue that turns in conversation do not affect the occurrence of zero pronouns when the referent is in focus.

- (5) A: *Wo neige jiaoshou yao dao Zhongguo qu.*
 my that-CL professor will go China to
 'That professor of mine will go to China.'
- B: (a) *Ø sha shihou qu?*
 what time go
 'When will (he) go?'
- A: *Ershijihao. Beijing you ge hui. Ranhou ta ziji taoqian*
 twenty-odd Beijing have CL meeting then he self pay-money
 'On the Twentieth. There is a meeting in Beijing. He will pay for his own trip.'
- B: (b) *Ø tao lufei*
 oh pay travel-expense
 'Oh, (he) is paying for his plane ticket.'
- A: (c) *Ø qu le yihou Ø gei renjia haiyao jiangke*
 go PFV after give other-people also-will lecture
 'After (he) arrives, (he) will also give lectures.'
- B: (d) *o. nei ge xuexiao?*
 oh which CL school
 'Oh. At which school?'
- A: *Beijing youdian xueyuan*
 Beijing post-telecommunication university
 'At the Beijing Post and Telecommunications University.'
 (Conversation PL)

The character *wo neige jiaoshou* 'that professor of mine' is introduced into the conversation by speaker A. Speaker B then takes a turn and continues to talk about the professor, using a zero pronoun in (a). As they take turns in the subsequent conversation, zero pronouns continue to be used to refer to the same professor as in NP (b) and (c). Thus the example suggests that turns in conversation do not affect the use of zero pronouns in referring to a focused referent. This is further supported by example (6), taken from a conversation in which three people are talking about a river:

- (6) A: *Suzhouhe* *buxing*. \emptyset *chou* *de* *yaosi*. \emptyset *heide*.
 Suzhou-river not-OK stinking NOM will-die black
 'The Suzhou River is not okay. (It) stinks so much. (It) is black.'
- B: (a) \emptyset *shi* *ma*?
 is Q
 'Is (it) really?'
- C: *Wojia* *jiuzai* *suzhouhe* *nar*
 my-home just-at Suzhou-river there
 'My home is near the Suzhou River.'
- A: *ng* (b) \emptyset *chou* *de* *yaosi*. \emptyset *hen* *chou* *hen* *chou*.
 Interj. stinking NOM will-die very stinking very stinking
 '(It) stinks. (It) really, really stinks.'
- B: (c) \emptyset *weishenme* *hui* *chou* *me*?
 why can stinking
 'Why does (it) stink?'
- A: (d) \emptyset *shi* *wuran* *de*. \emptyset *paifang* *wuran*.
 is polluted NOM discharge pollution
 '(It) is polluted. (They) pollute (it).'
- B: *gongchang*?
 factory
 'Factories?'
- A: *gongchang*.
 factory
 'Factories.' (Conversation SJL)

In (6), the topic *Suzhouhe* 'the Suzhou River' is brought into the conversation by speaker A. Speaker B takes a turn and continues to talk about it, using the zero pronoun to refer to it in NP (a). Afterwards, zero pronouns are used in NP (b), (c) and (d), referring to the river as the topic continues. Thus, switching turns in conversation does not interrupt the use of the zero pronoun.

Consider example (7), taken from a novel (Xing 1991). Example (7) is the first sentence in Part 1 of Chapter 5 in the novel:

- (7). \emptyset *bei* *lingru*, \emptyset *bei* *zaige*, \emptyset *bei* *ansuan*. *Qi* *feng* *ku*
 BEI insulted BEI oppressed BEI plotted-against chilly wind bitter
yu *zhi* *zhong*, *yibai* *wushi* *tian* *piaoyao* *er* *qu*.
 rain of midst one-hundred fifty day float then go
 '(He) was insulted, (he) was oppressed and (he) was plotted against. In the midst of chilly wind and bitter rain, one hundred and fifty days passed.' (Xing 62)

Although the excerpt occurs at the beginning of a new section in the novel, zero pronouns are used to refer to the main character.

The above examples show that the use of *dan* 'but', switching turns in conversation, and paragraph or chapter boundaries do not affect the use of zero pronouns when they refer to highly focused referents. Next I show that zero pronouns can also be used to refer to a re-mentioned referent after a considerable absence, if the referent is assumed to remain in the addressee's mind.

Example (8) is from a conversation in which the husband and wife are talking about cholesterol. Since the whole conversation is about cholesterol, it is considered a higher-order topic in Gundel et al.'s terms.

- (8) A: *Nage difang?*
 which place
 'Where?'

B: *Jiushi xueguan libian you danguchun de jiu qu chulai le me.*
 just blood-vessel inside have cholesterol NOM then take out CRS MAUX
 'Just inside the blood vessels, (you) take out the blood vessels where cholesterol is.'

A: *Dui, ni guanjian shi name duo xueguan, ni nadian ya?*
 right you what-is-crucial is that many blood-vessel you which-section MAUX
 'Right. The question is: Which one out of so many blood vessels?'

B: *Na duan? Na bu si le yiban xinzang you xie.. jintian*
 which section? that not die PFV generally heart has some today

zhuyao shi jiang guanxing xinzang bing, zhiti de xueguan bu
 mainly is talk coronary heart disease limbs NOM blood-vessel not

hui zhang (a) \emptyset , *zhujiao shi guanzhang xueguan zhang* (b) \emptyset , *yinwei*
 will grow mainly is coronary artery grow because

(c) *ta zoude wanqu, shijishang, nao xueguan ye zhang*
 it walk-csc curved in-fact brain blood-vessel also grow

(d) \emptyset , (e) *ta zoude tai wanwanququ,*
 it walk-csc too curving

'Which section? It's obvious when you look at the blood vessels of those who died of a heart attack.. Today they (the TV *Discovery* channel) mainly talk about coronary heart disease. (Cholesterol) does not accumulate in the blood vessels of the limbs. (It) mainly collects in the coronary artery because it is curved. In fact, (cholesterol) accumulates also in the blood vessels of the brain because they are very curved.'

A: *Huozhe neige [xinzang bing.*
 perhaps that heart disease
 'Or perhaps heart disease.'

- (8) B: └ (f) *ta tebie rongyi chu wenti, suoyi zhege*
 it extremely easy occur problem so this-CL
 ‘so it is extremely easy for them to have problems.’
wenti jiushuo ni xianzai jiushi yao shaochi zhifang,
 question that-is you now just need little-eat fact
 (g) *∅ jiushi laide man yidian, zhe shi diyi.....*
 then come-csc slow one-bit this is the-first-point
 ‘So the issue is that now you need to eat little fat, and then (cholesterol)
 accumulates slowly. This is the first point...’
 (Conversation ZS)

Zero pronouns are used in NP (a), (b) and (d) in (8) to refer to cholesterol. Although the current focus of attention is on the blood vessels, cholesterol is a still-relevant higher-order topic, since it is the topic of the whole conversation. Thus, even though *cholesterol* is not mentioned in the immediately preceding clause and even though there is a considerable distance between its previous mention and the present mention, zero pronouns are used in (a), (b) and (d). The conditioning factor is that *cholesterol* is still in focus and is assumed to be identifiable by the addressee.

Consider again the use of a zero pronoun in NP (g). *Zero* is used in (g) to refer to *cholesterol* again after a considerable absence. In previous clauses, first, *guanzhang xueguan* ‘coronary artery’ is in focus as in NP (c). Then, the NP *nao xueguan* ‘blood vessels in the brain’ is in focus as in NP (e) and (f). When *cholesterol* is re-mentioned again in NP (g) after some absence, a zero pronoun is used by the speaker, suggesting that he is sure that the addressee is able to identify the referent since it is a higher-order topic.

These examples have demonstrated that the zero pronoun is used when a referent is assumed to be still in the addressee’s consciousness even though there is a considerable time lapse from the previous mention.

3. NONOCCURRENCE OF ZERO PRONOUN: OVERT PRONOUN OR FULL NP. I have noted cases in which all the conditions for the use of the zero pronoun are met, but instead an overt pronoun or a full NP is used to refer to a focused referent. I argue that the use of an overt pronoun or a full NP is to highlight referential salience. Consider the overt pronouns in example (9), which is part of (8) repeated for current discussion:

- (9) A:*jintian zhuyao shi jiang guanxing xinzeang bing, zhibi de*
 today mainly is talk coronary heart disease limbs NOM
 xueguan bu hui zhang ∅, zhujiao shi (a) guanzhang xueguan
 blood-vessel not will grow mainly is coronary artery
 zhang ∅, yinwei (b) ta zoude wanqu, shijishang, (c) nao
 grow because it walk-csc curved in-fact brain

xueguan *ye* *zhang* ∅, (d) *ta* *zoude* *tai* *wanwanququ*
 blood-vessel also grow it walk-CSC too curving

'Today they (the TV *Discovery* channel) mainly talk about coronary heart disease. (Cholesterol) does not accumulate in the blood vessels of the limbs. (It) mainly collects in the coronary artery because it is curved. In fact, (cholesterol) accumulates also in the blood vessels of the brain because they are very curved.'

B: *Huozhe neige* [*xinzang bing*.
 perhaps that heart disease
 'Or perhaps heart disease.'

A: [(e) *ta* *tebie* *rongyi* *chu* *wenti*, *suoyi* *zhege* *wenti*.....
 it extremely easy occur problem so this-CL question
 'so it is extremely easy for them to have problems...'
 (Conversation ZS)

In (9), after the topic *guan Zhang xueguan* 'coronary artery' in NP (a) is brought into the discourse, a zero pronoun can be used to refer to it. However, in the conversation, the speaker uses an overt pronoun *ta* 'it' to make reference to it. Since the use of a zero pronoun does not cause any ambiguity, the use of *ta* 'it' strongly suggests that the speaker wants to draw attention to this important referent by keeping it in view so that the addressee will not take it for granted. Thus, the use of an overt pronoun indicates the speaker's communicative intention to make it referentially salient.

Consider example (10) from a magazine article:

- (10) (a) *Zuhe* *shuxue* *shi* *yi* *men* *ji* *gulao* *you*
 combinatorial mathematics is one CL not-only ancient but-also
 xiandai *de* *shuxue* *de* *yige* *fenzhi*, (b) *ta* *shejida*
 modern NOM mathematics NOM one-CL branch it relate-to
 shuxue *de* *gege* *fenzhi*, (c) ∅ *xuduo* *wenti* *you* *hen*
 mathematics NOM every branch many questions also very
 jianshen.....
 difficult-to-understand

'Combinatorial mathematics is a branch of mathematics that is not only ancient but also modern. It relates to each and every branch of mathematics. Many questions are also difficult to answer.' (*China Scholars Abroad*, Vol. 2, 1997, p.15)

The NP *zuhe shuxue* 'combinatorial mathematics' is first brought into the discourse in (a). The subsequent mention is encoded with an overt pronoun *ta* 'it' in (b), although the use of a zero pronoun is acceptable in this context. The use of an overt pronoun again suggests the writer's intent to highlight the referential salience of *combinatorial*

mathematics by keeping it in view. The use of *zero* in this context would fail to convey such referential salience.

Consider example (11) where a full NP is repeated:

- (11) (a) *Xiancha* you *mingxian de* *xingfen tishen* *zuoyong*, \emptyset *chi le*
 salty-tea have obvious NOM exciting refreshing function eat PFV
 (b) *xiancha* \emptyset *jike* *xiaochu baitian laozuo de* *pibei*, \emptyset *you*
 salty-tea at-once remove daytime work NOM tiredness also
neng guofu.
 can warm-stomach

'Salty tea has a clear stimulating and refreshing function. Once (you) drink salty tea, (you'll) immediately get rid of all your tiredness and (it) can warm your stomach as well.' (*China's Scholars Abroad*, Vol. 11, 1995, p.39)

The NP *xiancha* 'salty tea' is introduced in (a). It is interesting to note that the full NP *xiancha* 'salty tea' is used again in NP (b) to refer to the same salty tea. Note that the NP *xiancha* 'salty tea' is the direct object of *drink*. Normally, a zero pronoun is used to refer to a direct object whose referent has been introduced. By using a full NP, the speaker conveys a sense of referential importance of the entity, thus emphasizing the function of the salty tea.

Example (12) further supports this argument:

- (12) A: *Hecha jiang danguchun. Hejiu jiang danguchun.*
 drink-tea lower cholesterol drink-wine lower cholesterol
 'Drinking tea lowers cholesterol. Drinking wine lowers cholesterol.'
 B: *Hecha, neilitou you* (a) *kafeiyin.*
 drink-tea that-inside have caffeine
 'But there is caffeine in tea.'
 A: (b) *Kafeiyin shi kafeiyin me.* (c) *Kafeiyin keshi dui naozi bu hao.*
 caffeine is caffeine MAUX caffeine may to brain not good
 'Yes. It's true that there is caffeine in it. Caffeine may not be good for the brain.'
 (d) *Kafeiyin zhuyao dui xiaohai bu hao. Xiaohai hewan le*
 caffeine mainly to child not good child drink-finish PFV
 (e) \emptyset *dou ke xingfen.*
 all very excited
 'Caffeine is mainly bad for children. After children drink (caffeine), (they) all become very excited.' (Conversation ZS)

In (12), *kafeiyin* 'caffeine' becomes a very important topic in the conversation. It is first brought into the conversation by speaker B and mentioned several times in the

subsequent discourse in (b), (c), and (d). Each time the speaker uses a full noun to refer to an unambiguous referent, *caffeine*. By doing so, he draws attention to it and emphasizes its referential importance.

The above examples suggest that a pronoun or a full NP rather than a zero pronoun is required when there is a need to highlight a referentially important referent. Thus by using overt pronouns or full NPs, the referent is kept in view and is highlighted more than if it were coded by a zero pronoun.

4. ZERO PRONOUN AND MINOR REFERENTIALITY. In this section, we give examples where zero pronouns are used to make general reference to a type-identifiable entity rather than specific reference to a focused or activated entity. In most cases, these zero pronouns are used to refer to people in general; however, no particular people are in mind when the speaker/writer uses the zero pronoun to refer to them. Consider (13), from a magazine article on how to predict people's lifespans:

- (13) *Ruguo* (a) \emptyset *cong chengren shenshang quxia chengxianwei*
 if from adult body take growing-fiber
xibao jinxing peiyang shi, xibao chuandai shu suizhe
 cell conduct culture when cell pass-on number as
gongti nianling zhengzhang, faner xiajiang, yiban
 supply-body age increase on-the-contrary decrease normally
pingjun ke chuandao 10 zhi 30 dai.
 average may pass-on 10 to 30 generation

'If (we) take growing fiber cells from an adult body to make a culture of cells, the number of cells passing on decreases as the age of the body which supplies the cells increases. Normally, it (the number of cells passing on) is an average of 10 to 30 generations.' (Duzhe, Vol. 2, 1995, p.19)

In (13), NP (a) is very general in its reference, referring to people in general with no particular individual in mind. Thus, who takes the growing fiber cells from an adult body is not specified and is not necessary to specify. Moreover, the referent of the zero pronoun is referentially incidental. Therefore the agent, who takes the growing fiber cells from an adult body, is unimportant; what is important is the fact that the growing fiber cells are taken.

Consider example (14):

- (14) *Ruguo* (a) \emptyset *shenru fenxi zhexie xianxiang*, (b) \emptyset *jiu you keneng*
 if deeply analyze these phenomenon then have possibly
queding shuailao he shouming de jili.
 make-sure senility and life-span NOM mechanism

- (14) 'If (we) analyze these phenomena in depth, then (we) will possibly ascertain the mechanism controlling senility and the life-span.' (Duzhe, Vol. 2, 1995, p.19)

The zero pronouns in NP (a) and (b) have very general reference, referring again to people in general with no specified individual in mind. NP (a) and (b) are not referentially important either. Thus zero pronouns are used to signal this insignificance.

Example (15) is from a magazine article about private schools in China:

- (15) *Guanyu sixue de qiyuan,*
 about private-school NOM origin
Zhishi genju shishu de jizai, (a) Ø chazhengchu
 only according-to historical-records NOM record find-out
dati de shijian shi zai chunqiu shiqi zhongye
 roughly NOM time is at Spring-Autumn Period amongst

'About the origin of private schools... after studying what was in the historical records, (people) learned that it was roughly during the Spring and Autumn Period, 770-476 B.C.' (*The Successor of China*, Vol. 1, 1994, p.27)

NP (a) refers to people in general. The focus of attention is not on the who but on when private schools were first started. Thus, no particular individual attention is intended for the person who learned about it and with the zero pronoun the referential identity is meant to be unimportant.

The above examples show that type-identifiable zero pronouns occur mostly in contexts where the role of the agent is not important and the use of zero pronouns promotes the importance of the rest of the sentence. This function of the zero pronoun is also found in the passive construction in English, where the agent is very often omitted if the role of an agent is unimportant in discourse. Thus we can translate (13) as *If growing fiber cells are taken from an adult body*; (14) as *If these phenomena are analyzed in depth, the mechanism controlling senility and the life-span will be ascertained*; and (15) as *It was learned that it was in the middle of the Spring and Autumn Period*. In these translations, all the agents are omitted, as they are referentially unimportant.

5. SUMMARY. In this study, I have discussed the use of zero pronouns to refer to the speech participants, *I* and *you*. I have also shown that zero pronouns are used for different reasons: one is to refer to focused and referentially important entities and the other is to make general reference to referentially unimportant entities.

¹ I would like to thank the Chinese students at Ball State University for helping me tape-record their conversations for this study, without whose support I would not have been

able to complete this project. I also thank Drs. Elizabeth M. Riddle, Herbert Stahlke, Frank Trechsel, and three anonymous reviewers for their critical comments and suggestions.

- ² I transcribed the conversational data using the following notational conventions:

[indicates point at which the two utterances overlap
 .. indicates pause
 ? indicates questioning intonation
 , indicates an intonation group
 . indicates the end of a sentence

- ³ Chinese examples are transcribed in the Pinyin system with tones suppressed. The abbreviations used in the glosses are given below:

ASSO	associative (- <i>de</i>)
BA	a pretransitive marker
BEI	a passive marker
CL	classifier
CRS	currently relevant state (<i>le</i>)
CSC	complex stative construction (<i>de</i>)
DUR	durative aspect (- <i>zhe, zai</i>)
EXP	experiential aspect (- <i>guo</i>)
GEN	genitive (- <i>de</i>)
Interj.	interjections in speech
MAUX	auxiliary words expressing mood in speech (<i>ma, ne, ba, a</i>)
NOM	nominalizer
PFV	perfective aspect (- <i>le</i>)
Q	question marker (<i>ma</i>)

- ⁴ In this paper, the term 'focus' is being used differently than by Chafe (1976) and Lambrecht (1994), for example, where 'focus' may represent the new information in relation to the 'topic' signaling what a sentence is about. I use Gundel et al.'s term 'in focus' to mean that 'the referent is not only in short-term memory, but is also at the current center of attention' (279) of the listener. Thus, a topic NP may be in focus if it is in the listener's conscious mind.

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LINGUISTIC LESSONS FROM THE WAR ON TERRORISM

SARAH TSIANG

Eastern Kentucky University

THIS PAPER CONSIDERS THE ROLE of the media in enriching the language and increasing the linguistic awareness of the general public. Media coverage of current events brings new vocabulary and ways of speaking into popular usage, and brings to attention linguistic viewpoints important for understanding the topics discussed. Thus Americans learned 'Don't ask, don't tell' from the debate over gays in the military and *chad* from the vote-counting controversy in Florida during the 2000 presidential election¹. President Bill Clinton's court testimony denying perjury and obstruction of justice during the Monica Lewinsky scandal got people thinking about the tense value of *is* and the semantic range of *sex*².

Recently, coverage of September 11th and its aftermath have dominated the news. Stories about the backgrounds of the terrorists, the culture of Islam, and the war on terrorism have introduced a variety of foreign words and specialized vocabulary from English into the vernacular. Moreover, the news has been a source and record of the new rhetoric that has been developing on the basis of recent events. Finally, news reports have informed us about foreign languages and their importance, and illustrated how linguistic clues have been helpful in investigating terrorist activities. As a result, the September 11th coverage represents an important source of linguistic information.

Based on examples from the September 11th coverage in the main American news-magazines, this paper illustrates how media usage and explanation can develop our language and language skills. We can conclude that following the news is an effective way for readers to keep their language current, and increase their understanding of language and language issues.

1. CORPUS AND METHODOLOGY. All articles related to September 11th in *Time* (T), *Newsweek* (N), and *U.S. News and World Report* (USN) for the six months following September 11, 2001, were reviewed; 77 issues total. Collected for the study as examples of how the media communicates linguistic information were: (1) words and expressions from foreign languages and specialized vocabulary from English, e.g. *loya jirgha* 'grand national council', *hazmat* 'hazardous materials'; (2) new expressions and types of expression related to September 11th, e.g. 'homeland security', 'axis of evil'; and (3) linguistic explanations and commentary, e.g. 'Pashto is the main language of Afghanistan'. Instances where helpful linguistic explanation is not supplied were also noted. The observations that follow are based on a preliminary survey of the corpus intended to identify examples and issues of interest for further investigation.

2. ENRICHING OUR LANGUAGE.

2.1. VOCABULARY FROM FOREIGN LANGUAGES. Typical readers must learn new vocabulary in order to understand the September 11th coverage, since it characteristically contains a large number of words from Arabic and other foreign languages, as well as specialized vocabulary and usages from English. For example, they will encounter sentences like: 'Once in the mosque, they can become bait for traveling imams preaching jihad' (N10/29/01); or, 'The American street is now willing to employ ayatullah vocabularies—to think in fatwas' (T12/10/01).

2.1.1. WORDS AND EXPRESSIONS. In Table 1, foreign language words and expressions that are translated or explained in the coverage are listed together with brief characterizations. What should be familiar foreign words from the region, since they appear without remark, are *bazaar*, *hashish*, *shish kebab*, *hummus*, *pita bread*, *chutney*, *couscous*, *caftan*, *Muslim*, *kaffiyeh*, *kohl*, *turban*, *muezzin*, *souk*, *rupee*, *purdah*, *baksheesh*, *mosque*.

2.1.2. TRANSLATION AND WORD HISTORY. Many foreign-origin proper names occur in the coverage, particularly placenames and names of organizations, only some of which are translated. In some cases, the translation appears to be only an added detail, e.g. that the name of the Islamic group *al Itihaad al-Islamiya* means 'Unity of Islam' (T12/24/01). Other explanations appear added for interest. For example, we learn that Kandahar is named for Alexander the Great; that the words *thug*, *zealot*, and *assassin* (from *hashashin* users of hashish) come from ancient terror cults of Hindus, Jews, and Muslims; and that algebra is an Arabic invention (N10/15/01).

In other cases, the translation is probably included to produce an impression about the referent. Thus it helps create atmosphere when we learn that the name of the city Mazar-e Sharif means 'Graveyard of the Righteous', and that Tora Bora, a main battlefield area, means 'Black Widow' (N11/19/01, N12/10/01). We learn that Osama bin Laden did business with the company *Al Taqwa* 'Wrath of God' (renamed Nada Management), and that Libyan leader Muammer Gaddafi named one of his sons *Seif al Islam* 'Sword of Islam' (N10/15/01, T11/12/01). We can find on a map of Kabul the 'Department for the Preservation of Virtue and the Suppression of Vice' (N10/29/01). Finally, learning that apparent lead suicide bomber Mohamed Atta was called by his father *Bobol*, Arabic slang for 'little singing bird', increases our understanding of Atta as an emotionally troubled man (T10/8/01).

For certain concepts, literal translation and etymological information are supplied to make clearer the bases for their interpretation. For example, we are told that *Islam* means 'surrender', and is related to Arabic *salam* 'peace' (N9/24/01, T10/1/01). The view of Islam as a peaceful religion is promoted by Muslims and picked up by President George W. Bush, who tells Muslims: 'I have told the nation more than once that ours is a war against evil, against extremists [and] that the teachings of Islam are the teachings of peace and good' (T10/15/01).

It is explained that *jihad* literally means 'effort' but has a variety of meanings in context. This is a linguistic contribution toward settling the debate over its interpretation,

Islam	
	<i>Allah</i> ('God'), <i>madrasa</i> (Quranic school), <i>Islam</i> ('surrender'), <i>Islamist</i> (ideologue).
	Types of Muslim cleric: <i>sheikh</i> , <i>mullah</i> , <i>imam</i> , <i>mufti</i> ('jurist'), <i>ayatollah</i> .
	Religious texts and prayers: <i>Quran</i> ('God's word'), <i>sura</i> (chapter of Quran), <i>ahadith</i> (sayings, stories of Muhammed), <i>sharia</i> (rules for Islamic living), <i>shahada</i> ('There is no God but Allah...'), <i>salat</i> (daily prayers).
	Sects: <i>Shi'ite</i> , <i>Sunni</i> , <i>Wahhabi</i> , <i>Takfir wal Hijra</i> (an ideology), <i>Sufi</i> (mystical tradition).
	Concepts: <i>jihad</i> , <i>jihadi</i> , <i>jihadist</i> (holy war, holy warrior), <i>fatwa</i> (religious decree), <i>shahid</i> (holy martyr), <i>ummah</i> (community), <i>salam</i> (peace), <i>shirk</i> (idolatry), <i>mujad-did</i> (renewer of the faith), <i>jinn</i> (kind of spirit), <i>mi'raj</i> (Ascension), <i>an-Nar</i> (hell), <i>jahiliyya</i> (pre-Islam pagan state).
	Expressions: <i>Allahu akbar</i> (God is great), <i>ma sha'a Allah</i> , <i>inshallah</i> (as God wills), <i>La illah illa Allah</i> ; <i>Muhammad rasoul Allah</i> ('There is only one God, Mohammed is God's prophet').
	Holy days and rituals: <i>Ramadan</i> (holy month), <i>hajj</i> , <i>hajji</i> (pilgrimage, pilgrim), <i>Eid</i> (holy day).
Culture of the Middle East and Afghanistan	
	Food: <i>halal</i> (like kosher), <i>kibbe</i> (Lebanese cracked wheat dish), <i>qabeli</i> (Afghan rice dish).
	Fashion: Women's: <i>burqa</i> (head-to-toe veil), <i>chador</i> (cloak), <i>dupatta</i> (shawl), <i>hijab</i> (headscarf), <i>niqab</i> (kind of veil), <i>abaya</i> (cloak); Fashion: Men's: <i>shalwar kameez</i> (pajama), <i>pakul</i> (wool hat), <i>chapan</i> (cloak), <i>astrakan</i> (lamb's wool cap).
	History: <i>caliph</i> , <i>caliphate</i> (title of ruler, realm), <i>emir</i> ('ruler').
	Afghanistan: <i>loya jirgha</i> (grand national council), <i>shura</i> (kind of council), <i>sangar</i> (encampment), <i>zarbati</i> (strike unit), <i>afghani</i> (currency), <i>buzkashi</i> (a sport).
	Miscellaneous: <i>hawala</i> , <i>hundi</i> (trust-based banking), <i>bayat</i> (oath), <i>Abu</i> ('Father'), <i>al mutuaa marriage</i> (temporary marriage), <i>nargile</i> (water pipe), <i>bassamat al-farah</i> ('smile of joy'), <i>hira mandi</i> (prostitutes' quarter), <i>Almohtaram</i> ('Respected One'), <i>maulvi</i> (name for teacher), <i>bobol</i> ('little singing bird'), <i>Amir-ul-Momineen</i> ('Commander of the Faithful'), <i>bayan</i> (Ms.), <i>munafaqueen</i> (hypocrites), <i>nobadmashi</i> (no troublemaking), <i>al Yamamah</i> (dove), <i>hashashin</i> (hashish users), <i>muttawa</i> (public-decency police), <i>malang</i> (intoxicated one).
Ethnic, political, military groups and movements	
	<i>Taliban</i> , <i>Talib</i> ('the students'), <i>Al Qaeda</i> ('the base'), <i>mujahedin</i> , <i>mujahed</i> (resistance group, fighter), <i>afghani</i> (Saudis supporting <i>mujahedin</i>), <i>intifada</i> ('uprising'), <i>mohajir</i> (Indian Muslim refugees).

Table 1. Foreign words and expressions used in the coverage.

hazmat, haz-mat (hazardous materials, e.g. anthrax), *steganography* ('hidden writing'), *target-rich* (what Afghanistan is not), *Arab street* (Arab countries); and the ethnic epithets: *sand n-----r, diaper-head, raghead, slave*.

Table 2. *Specialized vocabulary and expressions from English used in the coverage.*

relevant for understanding the motivation for terrorist acts (N9/24/01, USN10/1/01, N2/11/02). It is also explained that *Allah* is the Arabic word for 'God'. This is important because there is considerable misunderstanding as well as theological debate over whether the Muslim 'God' is the same as the Christian and the Jewish one (T10/1/01, N10/15/01, N12/24/01).

2.2. VOCABULARY FROM ENGLISH. Specialized vocabulary and expressions from English that occur in the coverage include the following words listed in Table 2.

Idioms that have become popular after September 11th include 'let's roll', the last words passenger Todd Beamer said to a telephone operator, just before, it is believed, he and other passengers attacked their hijackers, causing their plane to crash in a Pennsylvania field (T12/31/01). 'Connect the dots' is becoming a frequent expression as people discuss questions such as why September 11th wasn't foreseen despite the existence of certain pieces of information (T2/4/02).

The coverage also draws attention to the technical meaning or commercial value of words. Designating September 11th as an 'act of war' or 'extraordinary' will make a difference for victims filing insurance claims or trying to write off business losses; and the classification as 'unlawful combatant' vs. 'prisoner of war' will affect the treatment and rights of suspected terrorist detainees (N9/24/01, N10/15/01; N10/29/01). The Todd M. Beamer Foundation's attempts to control the marketing of 'let's roll' illustrate that ordinary language, as well as registered names like trademarks, can be the subject of claims of ownership (T12/31/01).

2.3. DEVELOPMENT OF A NEW RHETORIC.

2.3.1. THE RHETORIC OF WAR. Wars, and particularly wars in foreign lands that bring languages in contact, are well-known sources of new linguistic material (Hock 1991). Ammer 1999 is a collection of more than 1000 words 'from war, rebellion, and other combative capers'. Foreign words and expressions related to the war on terrorism that are current in the vernacular, or may become so, are discussed above. Furthermore, the innovative usages of writers and those quoted in the news are contributing to the development of a new rhetoric.

To begin with, September 11th is now a metaphor for the divide between the world before and the world after (T10/8/01). Ground Zero need no longer refer to a nuclear event; and America is now a homeland, as in 'homeland security' (N11/5/01). Just as a new kind of situation, a warlike state minus the shooting, was background for the coinage 'Cold War', the co-existing designations, 'war on terrorism', 'war on terror', and 'war in Afghanistan', reflect our coming to terms with a new kind of enemy

(Ammer 1999). So the head of the Office of Homeland Security is referred to as the 'anti-terror czar', who, like the 'drug czar', receives a non-traditional title for a non-traditional job (T10/15/01).

Some of the wartime rhetoric recycles expressions from previous conflicts. President Bush tries out the U.S. as crusader analogy; and his 'axis of evil' including Iran, Iraq, and North Korea manages to extend the good vs. evil theme of former presidents Ronald Reagan and George Bush, Sr., while at the same time reminding us of our enemies in World War II. However, these rhetorical offerings have faltered in light of Muslim protest over the crusader theme and confusion over a set of elements unrelated in important respects (N10/1/01, T2/11/02). But it is very clear that no one wants another quagmire/Vietnam or Mogadishu (USN11/26/01, N9/24/01).

We occasionally encounter the expression *ethnic cleansing* (or *cleansing*), a coinage from the War in Bosnia, in descriptions of Taliban or anti-Taliban offensives (T10/29/01, USN11/26/01, T10/1/01; Oxford 1997). Since forced population shifts were apparently not as much a tactic in this war, we may expect no more frequent usage than this. However, while the climate of terrorism was all about suicide bombers, the expression *kamikaze* 'divine wind (suicide pilot)' is only occasionally used, probably because it has an especially strong and exclusive association with World War II, like *Holocaust/holocaust* (Oxford 1999, Novick 1999); and because wartime Japan is distant in history and culture while suicide bombers are now active in Israel.

Mujahedin occurs frequently in the coverage and is used to simultaneously designate several different groups: the *mujahedin* of the past, i.e. the American-supported local resistance group that forced the Soviets out of Afghanistan in the 1980s; the contemporary Taliban; different forces opposing the Taliban; and Muslim fighters in general, e.g. supporting Muslims in Bosnia (T10/1/01; N12/10/01; N11/26/01; N12/24/01). As the particular referent in context is occasionally unclear, an explanation that *mujahedin* has a general meaning like 'Islamic guerilla fighters' would be useful (Oxford 2002).

2.3.2. POST-SEPTEMBER 11TH RHETORIC. Differences in the world after September 11th are reflected in the developing language. Now we must be aware of subtypes of terrorism like *cyberterrorism*, *bioterrorism*, and *macroterrorism* (with mass casualties); and the difference between *weapons of mass destruction* and *weapons of mass effect* (T12/17/01; T10/8/01).

Moreover, as we become acquainted with unfamiliar cultures, it is normal to view their world from our point of view; for example, the *burqa* in terms of the bra, as in *burqa-burning*, *tossing aside one's burqa*, and *buying her first burqa* (USN11/26/01, T12/3/01). The so-called American Taliban John Walker Lindh, an American discovered in combat on the Taliban side, began wearing a 'pillbox hat' after he converted to Islam (N12/17/01). The Afghan sport of *buzkashi*, in which a goat is grabbed from horseback, is described in terms of rugby and polo (USN1/14/02). And the '11-volume, Arabic-language *Encyclopedia of Jihad*, a handbook for an alleged terrorist group, sounds like a listing on Amazon.com (T10/29/01).

At the same time, we have begun to view our world from their point of view. So we can find Attorney General John Ashcroft labeled a 'holy warrior', and Republican conservatives labeled the 'Republican Taliban' (N12/10/01, USN11/19/01). A note introducing a new exhibit at the New York Metropolitan Museum of Art featuring lavishly bejeweled and ornamented objets d'art describes their creators, the Mughals who ruled India centuries ago, as 'the Taliban's basic nightmare' (T12/10/01). Considering the Mall of America from Osama bin Laden's point of view, reporter Joel Stein finds posters of Britney Spears and Jennifer Lopez, reigning pop princesses who characteristically show off their well-toned bodies, 'clearly chadorless' (T10/29/01).

This perspective-switching may lead to conflicting points of view; for example, Americans as both crusader and infidel. For Osama bin Laden (as for President Bush) we are the 'Crusader' forces; at the same time, our military presence in Saudi Arabia marks us as infidels, unbelievers in the land of Mecca (T10/15/01, N10/1/01, N9/24/01).

And finally, we can find some humor in it all. 'Camp X-ray' was the perfect name for the American facility in Cuba where suspected Taliban and Al Qaeda terrorists were incarcerated outdoors in completely open-sided cells and kept under constant watch. Expressions like 'reward in virgins' and 'a fourth spouse', referring to Quranic teachings on martyrdom and multiple marriage, give a lighter take on Islam (N1/14/02). We can find *burqa* defined as the 'signature head-to-toe garment' of Afghan women (T12/3/01).

3. DEVELOPING OUR UNDERSTANDING OF FOREIGN LANGUAGES.

3.1. FOREIGN LANGUAGE SITUATION. In the coverage, readers are made aware of the linguistic details of the countries and groups active in the war on terrorism. This useful background information can help readers understand alliances (e.g. between Pakistan and the Taliban, who share tribal, ethnic, and linguistic ties; T10/8/01), and points of difference between Islamic countries and groups, irrespective of their common religion (e.g. between Afghans, who speak Pashto, Farsi, and Dari, and members of Al Qaeda, who speak Arabic). So, the alert reader may recognize a poor if well-meaning tactic in the description: 'some of bin Laden's soldiers, fiercely defending Tora Bora caves against attacks by anti-Taliban Pashtun fighters, were desperate. Using megaphones, they shouted in Arabic down the ravines: 'We're Muslims, and you're Muslims. Muslims shouldn't fight each other!'' (N12/17/01). Moreover, it is a linguistic observation that poignantly shows us how unfortunate the Afghans really are; the problem with U.S. aid food packets is not that they are labeled in English (or Spanish), but that most of the people who receive them cannot read (N10/22/01).

Finally, our attention is drawn to the foreign language situation at home. The Iranian hostage crisis more than two decades ago brought to light the dearth of government-employable Americans competent in Middle-Eastern languages, and apparently nothing has changed. In the coverage we can find repeated references to the shortage of qualified translators, interpreters, and speakers of Arabic, Farsi, Pashto, and other key languages (e.g. USN10/8/01). It must have been sheer luck that someone at the Venice, Florida, bar where hijacker Mohamed Atta and friends were dining

shortly before September 11th had competency in Arabic, as the men were observed: 'shouting curse words in Arabic, reportedly including a particularly blasphemous one that roughly translates as "F--k God"' (N9/24/01).

The importance of getting Americans and the American point of view on Arabic TV is emphasized, and President Bush is recommended to learn a few Arabic words as a way of connecting with Muslims, for example, in an 'Ich bin ein Berliner' gesture (USN10/8/01, T11/5/01). An inspiration for him could be the Green Berets, who spend 'as much time, if not more' learning foreign languages and studying history and culture, as in combat training (N10/29/01).

3.2. LINGUISTIC FEATURES OF FOREIGN LANGUAGES. While newsmagazine readers will be introduced to a variety of exotic words, they will not receive guidance on their pronunciation. They are expected to feel comfortable with the 'q' without a 'u', as in *Al Qaeda*, and the reversed apostrophe, as in *Shi'ite*. And this is reasonable, since readers will certainly be listening to the news on TV and radio. Americans successfully switched over when pinyin romanization became the standard orthography for Chinese despite its use of 'q's (*Chungking* – *Chongqing*) and 'x's (*Sian* – *Xi'an*). Our good pronunciation is acknowledged in Secretary of Defense Donald Rumsfeld's comments to Secretary of State Colin Powell that such an important man should not have stand-out second-syllable stress on 'Kabul' (N1/28/02).

Readers can easily visualize the Arabic script, as it appears in numerous photos and graphics. However, no standard is followed for the romanization and orthography of Arabic and other languages of the region, indicating that the press is still feeling its way with the new material. Across the newsmagazines we will find *Al Qaeda* (*Newsweek*), *al-Qaeda* (*Time*), and *al Qaeda* (*U.S. News*); and *Koran* (*Time*, *U.S. News*) and *Quran*, *Qur'an* (*Newsweek*). For readers who learn to tune out these differences, the attempt of members of the bin Laden family to distance themselves from famous son Osama through the spelling 'Binladin' is certainly futile (N10/15/01). While it is doubtful that the 'q'-variant changed anyone's pronunciation of *Koran*, it does convey the foreignness of Arabic.

No attempt is made to explain any features of the grammar of Arabic or any other foreign language. However, *Newsweek* in particular sometimes alternates *Al Qaeda* (noun) and *Qaeda* (adjective), so we can find 'Al Qaeda operatives' beside 'Qaeda operatives', which may suggest to some readers that *al* (cf. 'the') is not the meaningful part. The inconsistent usage of *Talib* (*Taliban*) and *mujahed* (*mujahedin*) to designate individuals may also function as a grammatical clue. *Jihad* (the act) and *jihadi*, *jihadist* (the doer) comprise a data set for simple morphological analysis.

Occasionally, we find reference to the linguistic conventions of a particular culture. Criticizing U.S. intelligence efforts, a Saudi embassy official explains that Saudis would know that the names investigators were using were inadequate: 'In Saudi Arabia, you cannot begin an investigation until you have the four names—your name, your father's name, your grandfather's name, your family name' (USN10/1/01).

3.3. DISCOURSE TYPES AND RHETORICAL STYLES. On the one hand, examples from the discourse of other language communities help us recognize our common humanity. American readers can easily understand the Afghan saying: 'To kill a louse, you needn't set fire to your jacket' (T10/15/01); or the Taliban proverb: '[H]alf a mullah is a danger to your faith, half a doctor is a danger to your life' (N1/28/02); and especially bin Laden's obvious 'When people see a strong horse and a weak horse, by nature, they will like the strong horse' (USN12/24/01).

On the other hand, some discourse styles or types of expression they encounter may be unfamiliar. For example, in Afghan culture, getting down to business proceeds after 'seemingly endless rounds of greeting and tea drinking' and 'First it's 15 minutes of I love you and you love me' (N1/14/02). Background knowledge of Islam and the Quran would help readers understand statements like: 'It is not your day to die,' a reassurance to a reporter who has just avoided being hit by a grenade (N10/22/01); and, 'This is the day, God willing, you spend with the women of Paradise,' a line hijacker Mohamed Atta writes in instructions to his team, reminding them of Quranic promises (N12/3/01).

3.3.1 POETRY AND SENTIMENTAL EXPRESSION. A number of the quotations included in the coverage convey the impression that poetry and sentimentality are normal in Islamic culture. Thus, we find quoted lyrical passages of the Quran such as: 'Spend eternity in gardens of tranquility. / Youths of never-ending bloom will pass around to them decanters, beakers full of sparkling wine... / And companions with big beautiful eyes / Like pearls within their shells...' (N10/15/01); and bin Laden's own ode on the unlikely topic of the terrorist bombing of the U.S. Cole in Yemen: 'The pieces of the bodies of the infidels were flying like dust / If you had seen it with your own eyes, your heart would have been filled with joy' (T9/24/01).

A sentimental side of Al Qaeda can be found in the words of a husband to his wife (taped from a phone conversation): 'Tell me everything... Everything you feel, whether it is big or small. I wouldn't get bored listening to your voice' (N1/14/02); and in an Al Qaeda letter asking local residents to care for their dependents in their absence: 'If you look at how we are separated from the "meat of our hearts" the tears will flow from your eyes' (N1/14/02).

Adopting a similar style of expression, the U.S. government quotes an Afghan poem in a psy-op (psychological operation) radio message to the Afghan people: 'Just as the blood stains the apron of the butcher, unjustly shed blood remains on the hands of the murderer' (USN10/29/01).

3.3.2 SLOGANS AND PROPAGANDA. On television, Americans see images of demonstrations where militant Middle-Eastern-types are shouting anti-American slogans. In terrorist acts thought to be connected with September 11th, anthrax-tainted letters were sent to Senate Majority Leader Tom Daschle, NBC newsman Tom Brokaw, and the editor of the *New York Post*, all including the phrases: 'Death to America. Death to Israel. Allah is great' (T11/5/01). *Allahu akbar* 'God is great' occurs throughout the

coverage; e.g. it is the cry of soldiers attending to the words of their leaders. The hijackers received instructions to shout *Allahu akbar* during the hijacking, including as they 'slaughtered the animals,' because 'this strikes fear in the hearts of the unbelievers' (USN11/26/01, N10/15/01, N12/3/01).

Examples of a more literary style of anti-American expression can be found as well. Thus it is reported that a headline from an Islamic Jihad magazine reads: 'The great mother told her son: Your mother will live on bread and chutney, but will not settle for you to leave the path of jihad for this worldly life' (T11/19/01). We learn that listeners to Taliban pop can hear the lyrics of Saraji: 'This is our home, the house of lions and tigers / And best of all, this is the country of mujahedin and holy martyrs / We will beat everyone who attacks us' (N1/21/02).

3.3.3 RELIGION IN RHETORIC. A hallmark feature of discourse from the Islamic world appears to be the copious inclusion of religious references even in the most ordinary communication. For example, *inshallah* 'God willing' can be found in all kinds of contexts. It is explained that *ma sha'a Allah* 'as God wills' is an appropriate comment on seeing something beautiful; and, *La illah illa Allah / Muhammad rasoul Allah* 'There is only one God. Mohammed is God's prophet' is repeated by two people at parting (N10/15/01). The famous video in which Osama bin Laden takes responsibility for the September 11th attacks is heavily interspersed with phrases like 'by the grace of Allah,' 'Allah be praised,' and 'Allah bless his soul' (N12/24/01, USN12/24/01).

Hijacker Mohamed Atta dedicates his Hamburg University thesis: 'my life and my death belong to Allah, master of all worlds,' and Zacarias Moussaoui, who did not join the September 11th mission but was believed to have trained for it, responds in court to the charge of conspiracy: 'In the name of Allah, I do not have anything to plead' (T1/14/02). Adopting this style, British Prime Minister Tony Blair writes in an op-ed article for Arab newspapers: 'As the Prophet Muhammad (God's peace and blessings be upon him) said to his armies: "Do not kill women or children of non-combatants"' (T10/22/01).

4. LEARNING FROM LINGUISTIC CLUES. Finally, readers will see how linguistic clues have been used, or ignored, as America fights the war on terrorism. For example, accent is often noted as a sign of foreign identity or lack of assimilation (e.g. N10/1/01). When we learn that so-called American Taliban John Walker Lindh uses 'a heavily affected Arabic accent' when first discovered amidst Taliban fighters, but drops the 'faux Arab accent' for his day in court, we can guess at his linguistic strategy (N12/31/01, N2/18/02).

Proficiency in English also represents an important source of information for investigators. In the climate of fear of suicide bombers, Middle Eastern students at trucking schools became objects of suspicion as we can see in the reporter's parenthetical comment that follows this description: 'Because none of the students spoke English, they were accompanied by an interpreter... Even though English proficiency is a license requirement, all the Arab students received driver's licenses... (It's not

clear how they passed the written test, which is in English.)' (T10/22/01). An observation about the flight school experience of would-be hijacker Zacarias Moussaoui, who spoke 'fair English', but, 'some of the school's instructors had problems communicating with him', is used in explanation for his poor school performance (T10/1/01).

Investigators have also been interested in learning about communication among Al Qaeda members, and their secret communication methods in particular. For example, information or calls to action may be encrypted in Internet graphics, or communicated through signal statements; for example, Osama bin Laden's allegedly uncharacteristic 'I swear to God' in a videotaped message to followers (T10/22/01). Intercepted messages between suspected terrorists sent before September 11th and studied later include phrases like: 'There's a big thing coming' and 'We're ready to go' (N10/1/01). In response, National Security Advisor Condoleezza Rice gets American networks to agree to edit inflammatory language from Al Qaeda videos because they 'may contain secret messages to bin Laden "sleepers" to launch new attacks' (N10/22/01). How network censors would recognize the secret messages is not explained.

Finally, linguistic analysis has clearly been an important tool in the investigation of the anthrax letters sent to prominent American figures and organizations as a terrorist act. The text of the *New York Post* letter and the envelope of the letter to Senator Tom Daschle are reproduced (the original texts are handwritten) in examples (1)a and b below:

- | | |
|--|---|
| (1) a. 09-11-01
THIS IS NEXT
TAKE PENACILIN NOW
DEATH TO AMERICA
DEATH TO ISRAEL
ALLAH IS GREAT | b. SENATOR DASCHLE
509 HART SENATE OFFICE
BUILDING
WASHINGTON D.C. 20510
(T11/5/01) |
|--|---|

The study of the language of these letters led to interpretations including the following: "PENACILIN": The misspelling may be a mistake or a deliberate attempt to disguise a high level of intelligence and education and a mastery of English. "BUILDING": Because it sits on its own line and is not abbreviated, this may indicate someone not in the habit of writing in English' (T11/5/01). The letters were studied by famous literary forensic expert Don Foster, a professor of Vassar College, who offered the analysis: 'The syntax and vocabulary suggest someone who is not proficient in English... For example: "This is next / take penacilin [sic] now," instead of something more idiomatic like, "We're only getting started; time to take your penicillin"' (T11/5/01)³. Investigators hope to learn from the handwriting style as well, for example, the 09 instead of 9 in the dates, and the choice of block letters, though the potential significance of these choices is not suggested (T11/19/01).

5. EFFECTIVENESS OF THE MEDIA IN INCREASING LINGUISTIC AWARENESS. As we have seen, the coverage introduces a variety of new words and ways of speaking into

currency. In some cases, further explanation may help readers avoid confusion. For example, we don't really learn how the different types of 'Muslim cleric' differ. *Jihadist* is a peculiar expression beside *jihadi* and 'holy warrior'. The confusion over who are the *mujahedin* and other examples have already been mentioned. In other cases, as noted above, linguistically aware readers may want to know more.

In many cases, the linguistic explanations given are enlightening. For example, we learn that *sheikh* can be a clerical title as well as a secular one (T11/12/01). It is also useful to be reminded that a *fatwa* is a 'religious decree' and not a death sentence, as some people came to understand it after 1989, when Iranian leader Ayatollah Khomeini used one to condemn *Satanic Verses* author Salman Rushdie to death for his perceived blasphemy (Oxford 1999).

Of course it remains to be seen how many new words and usages will actually catch on over time. Knowing the names for fashion items such as *chapan* (an Uzbek cloak) or *astrakan* (an Afghan-style cap) is not so useful unless one intends to dress like Hamid Karzai, the recently elected Afghan leader cum fashion icon. On the other hand, there must be few Americans who cannot now picture a burqa, or who have no concept of jihad.

While talking about the war on terrorism has drawn from the language of previous conflicts, at the same time a new rhetoric is developing that reflects our experience of September 11th and our experience of the Islamic world in particular. This development can be illustrated in the language of a newspaper article that describes a godly man who is 'not a minister, not a priest, not an imam', and also provides the less inclusive exhortation: 'Believe in God, not the minister or priest, and you will never have a crisis of faith' (Davis 2002).

Readers are introduced to different languages of the world, their speakers, and ways of speaking, and those in search of a career direction must be inspired to study a language of the Near or Middle East. Moreover, readers encounter many instances where linguistic analysis has been a valuable source of important information and gain enough language awareness to make some linguistic observations of their own.

6. CONCLUSION. In the age of CNN and Internet, we are becoming a more informed public, and the media is responding to an audience that buys books *For Dummies*. For example, in the September 11th coverage we find the *Newsweek* sidebar, 'Reading Between the Lines: What bin Laden said and what it implies', and beside that 'His appearance and its meaning' (N10/22/01). *Time* offers: 'Headgear 101', introducing readers to the various headcoverings of Muslims around the world (T11/12/01). This combination of access and accessibility means that the media is in an excellent position to play the role of linguistics teacher. The present study suggests that it will do a competent job of it.

¹ Originally an expression coined by Senator Sam Nunn, 'Don't ask, don't tell' became official U.S. policy for the military in 1992. Homosexuals who did not publicly reveal their sexual orientation could not be discharged, and they could not be officially questioned

about it. A chad is the punch-out from a punch-out ballot. Vote-counting in Florida raised the question of how to evaluate ballots whose chads were not completely removed. See further in Hill and Hill (2001).

- ² In his grand jury testimony, President Clinton explained that his understanding of 'sexual relations' did not include particular actions traditionally interpreted as such. He offered the famous: 'It depends on what the meaning of the word "is" is' when asked to confirm an assertion about a sexual affair between him and Monica Lewinsky. See further in Schippers 2000.
- ³ Don Foster has applied his expertise in identifying unknown, uncertain, or anonymous authors based on textual clues in a variety of famous cases. For example, he helped the FBI link suspect Ted Kaczynski with the Unabomber writings. For a *New York* magazine assignment, he correctly identified journalist Joe Klein as the anonymous author of *Primary Colors*, a novel considered to be based on Bill Clinton's 1992 presidential campaign. Further details of his cases and casework can be found in Foster 2000.

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DIALOGUE IN MONOLOGUE: JAPANESE STORYTELLING ART

NORIKO WATANABE

Baruch College/The City University of New York

LISTENING TO A STORY CAN BE FUN¹. But how exactly do we understand a story? The world of a story is usually removed from the deictic orientations of the time and location of telling the story, and unlike watching a film, words alone create the removed world of the story. Understanding a story is not simply understanding all the words and grammar in the verbal text of a story. A mental representation of the story world has to be created and used to interpret the verbal text that follows.

In a Japanese storytelling art called Rakugo, conversations between characters are extensively used in its rather lengthy performances (Morioka & Sasaki 1990). Rakugo is performed by a single storyteller, but the storyteller speaks as characters. That is, dialogues within the monologic performances are crucial in creating the story world in this genre. When the audience listens to the performances of the verbal art, how do they comprehend the story? Is it a simple deciphering of linguistic forms in sequence?

I will examine which cognitive frameworks and pragmatic processes are involved in interpreting narrative discourse that employs both the dialogic mode and the monologic mode. I work with a model of language use based on Clark (1996 *passim*).

1. CLARK'S MODEL OF LANGUAGE USE. Clark (1996) proposes a model of language use that includes layering of actions. Clark views using language as simply a type of action that a person can engage in. His model categorizes all language use in terms of what actions are taken in a particular instance of language use. It provides a comprehensive system of what is known as context, or communicative setting, covering situations such as a simple conversation, overhearing, lecturing, writing a memo, reporting what others said, etc. How, then, do the widely recognized pragmatic principles, i.e. the Gricean Maxims, work within the model?

First, I examine the structure of layering in relation to the monologic narrative and the dialogic direct discourse of Rakugo storytelling. According to Clark's model some verbal communication has only one layer, while others have multiple layers of actions. For example, in a regular conversation there is often only one layer. Within the layer are the speaker and the addressee, as well as other contextual parameters of the particular communicative situation. Figure 1 and Figure 2 (overleaf) are illustrations of what the monologic and dialogic modes of narrative look like based on the Clark's model. Telling and listening to a story involve a joint pretense action as the first layer.

In Layer 1, the performer is telling a story to his audience, pretending that actions in Layer 2 are taking place. The action here is pretence, and the act of pretending here is taking place on the reality level and is therefore a 'serious act' in Goffman's

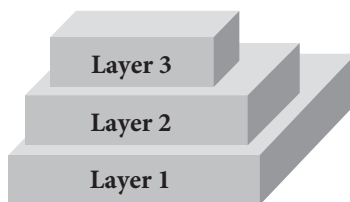
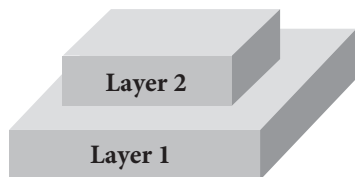


Figure 1. Layers of actions for monologue. **Figure 2.** Layers of actions for dialogue.

term (Goffman 1974). The act of pretending is what is actually happening. In Layer 2 the narrator/performer describes in monologue what is going on in the story to his audience. What the narrator is saying is not what is going on or what really happened. Layer 2 actions are non-serious acts.

Figure 2 shows the layers of actions for dialogue. In Layer 1, the performer is telling a story to his audience, pretending that actions in Layer 2 are taking place. This action is a serious act in Goffman's sense. In Layer 2 the narrator/performer is demonstrating in dialogue what is going on in the story. This is a non-serious act in Goffman's sense. In Layer 3 the characters in the story communicate with each other directly through their words.

2. THE GRICEAN MAXIMS AND NARRATIVE. The Gricean Maxims are the most well known pragmatic principles that apply to everyday conversations (Grice 1975). They prescribe the norm for the speaker and the addressee in verbal interactions. The Maxims are the kind of rules that are violated often, and through the violations of the rules conversational implicatures are created. Based on the model of layering, I will examine the scope of such pragmatic inferences in narrative, particularly what layer or layers are bound by such principles. I summarize the Gricean Maxims below.

- A. Maxim of quality says: 1) do not say what you believe to be false, 2) do not say that for which you lack adequate evidence.
- B. Maxim of relevance: Be relevant.
- C. Maxims of quantity: Make your contribution as informative as is required. Do not make your contribution more informative than is required.
- D. Maxims of manner: 1) avoid obscurity of expression, 2) avoid ambiguity, 3) be brief, 4) be orderly.

When people follow the maxims their conversation is based on the Cooperative Principle.

Yamaguchi (1988) is a provocative work that takes up the issue of the Gricean Maxims and joke narrative. Jokes often hide important and necessary information up to the punch line, and for this reason, a joke has been thought to violate the Gricean Maxims. Raskin (1985) labels jokes a *non bona fide* communication that does not fall within the realm of the Gricean Maxims. However, Yamaguchi concludes that joke

tellers do not violate the cooperative principle. Instead, it is the characters who violate it and therefore jokes are still within the influence of the cooperative principle. Yamaguchi named his theory 'the Character-Did-It Hypothesis':

- 1) One of the characters in a joke is free to violate the Maxims of conversation in order to produce the essential ambiguity of the joke.
- 2) The narrator must avoid violation of the Maxims. When for some reason the Maxims are to be violated in the narrator's own report of the event, either the narrator needs to pass on the responsibility for the violation to one of the characters, or at least to minimize the narrator's own responsibility for the violation in one way or another. (Yamaguchi 1988:327)

The following example is a joke from Yamaguchi's (1988:329) paper. It illustrates how the theory is applied. The example includes both monologic narration and dialogue of characters.

- (1) Randall asked his teacher if a person should be punished for something he hadn't done. 'No,' said the teacher. 'Of course not.'
'Good,' said the little boy, 'I haven't done my arithmetic.'

In (1), Randall's speech is reported indirectly in the first line of the example. The direct verbatim quote is not available and only the summary by the narrator is given. Although the question Randall asked the teacher violates the Maxim of quantity in the sense that he did not give enough information as to what he did not do, the narrator is simply summarizing what Randall said and therefore is not violating the Maxim. Randall asked what he asked, and the narrator simply described his verbal actions. If we interpret Yamaguchi's claim within Clark's framework, the Gricean Maxims apply to Layer 1, the narrator telling a story to the audience, and Layer 2, in which the narrator is describing what is going on, but not to Layer 3 in which the characters talk to each other. This is because characters' direct speech can freely violate the Gricean Maxim, while a violation in Layer 2 is not accepted because of the incoherence it produces.

In the following sections, I illustrate what status is given to the information in dialogue among characters, focusing on one of the most basic elements of any story, i.e., existence of characters.

3. MONOLOGIC MODE. In narration, a narrative statement can introduce a character in the story. For example, 'Once upon a time there lived an old man in a small house in the woods'. In order to understand what exists and what happened in the story world, one only needs to understand the meaning of the sentence and map it onto the representation of the story. The linguistic form determines what is being said. The deictic orientation of a story is different from a conversational setting, in which 'I' means the speaker, 'now' means the speech time, 'here' means the location of speech.

In a story, 'I' is essentially the narrator, which is theoretically separate from the performer, for the same reason that the writer is not the same person as the first person character in his novel. This is a shift in the deictic center of the narrative discourse. In Clark's theory, it corresponds to the shift from Layer 1 to Layer 2. The action in Layer 1 is between the speaker and the addressee who are interacting on the here-and-now level, i.e. reality. On this level, the two participants in the action, i.e. the speaker and the addressee, are clearly bound by the Gricean Maxims.

In Layer 2 the speaker is still speaking, but the deictic orientation of discourse is shifted to that of the story world. Duchan, Bruder and Hewitt (1995) address this issue in the Deictic Theory of narrative comprehension. The reader or the audience shifts the deictic center of the location, time and perspective from those of the real world to those of an image of themselves within the world of the story. Namely, 'I' becomes not the speaker, but the narrator, 'now' becomes not the speech time but the current time in the story, 'here' becomes not where the speaker/writer is but the location of the projected self in the story. Is Layer 2 bound by the Gricean Maxims?

Example (2) below is from a transcription of a performance from a story called *Hatena no chawan* 'Teabowl of Wonder'.

- (2) *sono mukashi kyoto no kiyamachi ni* —
 that long ago Kyoto LK² Kiyamachi LOC

chaya kinbee toyuu kantee no mejjin ga orimashita ↓
 Chaya Kinbee QT appraisal LK master NOM exist:PST

 'Once upon a time in Kiyamachi of Kyoto
 Lived a master of (fine arts) appraisal called Chaya Kinbee'

In this example the character Chaya Kinbee is introduced in the monologic narration. Once the character is introduced in monologic narration, the existence of the character can not be changed. A change in the basic proposition of existence will be a clear violation of the Gricean Maxim of Quality. Since the monologic narration corresponds to Layer 2 in Clark's model of layering, we can say that characters introduced in Layer 2 are not cancelable because the Gricean Maxim of Quality, 'Do not say what you believe to be false' is in effect on this level. If there was no compliance with the Maxim on this level, the narrator should be able to contradict himself, by saying that Chaya Kinbee actually did not exist in the story. The fact that the narrator can not cancel the existence of Kinbee suggests that Layer 2 is within the realm of the Maxim. This is in line with Yamaguchi's claim that views narration as a part of the narrator's responsibility.

4. DIALOGIC MODE. Many characters in Rakugo stories are never introduced in narration or mentioned in the monologue, but exist only as speaking voices. Whatever identification and beliefs are attributed to the voices are obtained through interpreting the content of the dialogue between characters. According to Clark's model, character's

speech or quotations are all demonstrations, and they form Layer 3. On this level, the deictic orientation of the utterances can be further removed from that of the narration. For example, if the speaking voice is different from the narrator, "I" does not refer to the narrator, but the character. If the speaking voice is the same as the narrator, the time frame may not be that of the narrator. Does Layer 3 still operate within the scope of the Maxims? Yamaguchi's analysis predicts no. Example (3) below shows the introduction of an inn employee character into the story 'Enemy at the Inn'. Prior to the dialogue given, the samurai has already been introduced in monologic narration.

- (3) (A samurai is standing in front of an inn)
'aa yuruse —'
 uhm pardon
'HEI OKOSHIYASU ↓'
 yes welcome
 'Uh, pardon me'.
 'YES, WELCOME !' (from 'Enemy at the Inn')

Layer 1: The storyteller is telling a story to his audience at the time the performance was recorded.

Layer 2: The narrator is demonstrating what the characters are saying sometime in the feudal period.

Layer 3: A samurai enters an inn with an interjection and someone answers him verbally.

The first line, 'Uh, pardon me' is the samurai's utterance. As soon as the answer, 'YES, WELCOME!' is given to the summons, the character who uttered the answer is introduced as a voice. In this case, the knowledge of grammar and the meanings of each word and utterance are not enough to make sense of the story. There are two types of pragmatic processes that need to be considered. One is the process of how to interpret the dialogic discourse, and the other is about whether the cooperative principles apply to the storyteller's demonstration of the character's verbal interactions. The former process is driven by various factors, including phonological and sociolinguistic knowledge regarding organizations of conversation, as well as register, style, regional and social varieties, etc. As far as the grammar is concerned, there are no verbs of speaking, such as 'A man said', 'he replied', etc., to help in assigning the voice to a character. Instead, the character simply emerges as a voice. For example, the first utterance in (3) above, 'Uh, pardon me', can be assigned not to the narrator's voice but to a character, on the basis of the fact that the voice quality is different from that of the narrator's normal voice. Also, the expression is archaic as a summons. It is not uttered by the performer and the narrator as himself in the middle of a storytelling performance. There is no explicit verbal identification of the sources of the voices given in this exchange. The identity of the source of the voice, 'Uh, pardon me', is inferred by matching who has been in the

story, i.e., the samurai, with the voice. Similarly, the answer to the summons ‘YES, WELCOME!’ is recognized as an utterance of a different person because the volume is louder and it is also a slightly outdated phrase that is used to greet a guest or a customer in a commercial setting. The phrase is not in the speech style of the samurai class but in that of a shopkeeper or an employee of a commercial establishment. Based on such knowledge, knowledge that lies outside of the grammar and lexicon, pragmatic inferences are made as to who is speaking and what is being said. Namely, the existence of characters in dialogic narrative discourse is established through pragmatic inferences of a different kind that are based on the background knowledge of the location, i.e. an inn during the feudal era, and the knowledge of conversational organization, i.e. the summons and answer, that assign the two utterances to the samurai and an inn employee. The identity of the source of the voice in line 2 of (3), ‘YES, WELCOME!’ is obtained only because the audience is familiar with who is likely to be at an inn and what the person who is there will say to a potential guest.

The existence of the voice, once recognized as a voice that is not attributable to an existing character, namely the samurai in this case, a new character’s existence is created in the story. Once it is created, it can not be cancelled by narration or by another character’s voice. In this sense Layer 2 of Figure 2 still adheres to the cooperative principle.

However, Layer 3 of Figure 2 is not bound by the cooperative principle, or at least as Yamaguchi hedges in his hypothesis, it is slightly ambiguous. Inferences about identity or anything else drawn from things in Layer 3 can be invalidated. In Example (4) from *Manjuu Kowai*, a group of men are talking and a man has just finished telling his silly story. Then an anonymous voice comments on it with an animated intonation. In the second line, in a low voice, another character’s voice comes in. The voice uses a phrase *wakaishuu* ‘young people’ to refer to the people who have been talking loudly. This is the first time in the story the age group of the people is mentioned.

- (4) (After a guy told a silly story, a man in the group comments on it.)

‘...*ahorashiite ikan de koitsu no hanashi wa* ↓’
 ...silly-TE no good COP this guy LK story TOP

‘*wakai mon ga yotte nani sawaiden ne ya* ↓’
 young person NOM gather-TE what raise voice NML COP

‘*oo oyassan* —
 oh Pops

maama kotchi ohairi — (continued)
 Interjection this way come in

‘...It’s much too silly, this guy’s story is.’
 ‘What are (you) young guys carrying on about?’
 ‘Oh, Pops,
 come on in, please. (continued)’

- Layer 1: The storyteller is telling a story to his audience at the time and place when the recording was done.
- Layer 2: The narrator is demonstrating what is happening in the story sometime in the past.
- Layer 3: An older male joins the conversation of young people by speaking to them directly.

The speaker of line 1 has no name or any characterization except that of his group when the phrase *wakaishuu* 'young guys' is used to address them. Line 3 is a response to the new voice. The address term *oyassan* 'Pops' gives a clue as to the identity of the speaker in line 2.

As far as the existence of the characters is concerned, the existence of the voice in line 1 and the existence of the voice in line 2 are not reversible as soon as the voices are recognized as belonging to different characters. However, the identity that is inferred from the dialogue content of the characters is changeable without the storyteller violating any maxim. *Oyassan* 'Pops' is a label that another speaker is putting on him in line 3. In his next turn, the 'Pops' has a chance to refute the label. If that happens, there is no violation of maxim on the part of the narrator. The violation is attributed to the offending character, since the characters themselves are bound by the maxims only within the story world. It is at this point, in Layer 3, the maxims that the speaker and the addressee comply with within Layer 1 lose their applicability.

Example (4) comes from a story called *Manjuu Kowai*, and later in the story the Pops character tells his own story of a ghost he experienced as a young man. Just when the story is at the climax of the horror and as the group keenly listens to him describe his action of running away from it and jumping from the bank of a river, Pops abruptly ends the story saying, 'and this is when I woke up [from my dream]'. In this case, the Pops character violated the Maxims of Quantity and Quality by misleading the listeners and making them think his story was real by not giving them enough information. However, the violation is within the story world and the ones who were deceived are the other characters.

3. CONCLUSION. In this paper I analyze dialogic discourse in stories told by a single storyteller. I apply Clark's theory of language use and Yamaguchi's analysis of joke stories to examine the interaction between the cognitive structure of storytelling and Gricean Maxims. Specifically, I focus on one of the most basic aspects of narrative, i.e. the existence of characters in the story, in order to examine the theoretical claim that Gricean Maxims apply to Layers 1 and 2, but not to Layer 3. This is because characters' direct speech (Layer 3) can freely violate the Gricean Maxims, whereas a violation on Layers 1 and 2 is not allowed.

I also briefly discuss another type of pragmatic inference that is crucial in introducing the existence of new characters in narrative discourse and identifying the source of dialogic utterances. An inference like the one about who is likely to answer an established character's question is drawn from the content of the sentences in

monologic narrative as well as in dialogue among characters. Such inferences are driven by frame and schema that come from cultural background knowledge.

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² Transcription keys (line change follows breath groups):

CAPITAL LETTERS	loud volume	TOP	topic particle
—	continuing intonation	NOM	nominative particle
↓	falling intonation	LK	genitive particle, or linker
↑	rising intonation	DAT	dative particle
COP	copula verb	LOC	locative
PST	past tense	QT	quotative

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III



UNDERSTANDING
LINGUISTICS THROUGH
THE REAL WORLD



ITERATIVE AND LEXICAL DENSITIES WITHIN GENRES

MICHAEL CUMMINGS
York University, Toronto

THE PURPOSE OF THIS PAPER is to summarize the results of an ongoing investigation into two indices, iterative density and lexical density, and how they relate to stylistic variation within micro-genres of a particular text type. Iterative density is a measure related to the degree to which a stretch of text remains consistently focussed on one or a few participants. Lexical density is taken as an indicator of the degree to which the experiential reference of the text—its 'field'—is articulated. Micro-genre is a term used (cf. 'elemental genre' Martin 1997:16) to designate the generic type of a text segment within a larger text.

1. REGISTER AND GENRE. In Systemic-Functional linguistics there are two conflicting approaches to the theory of genre, one whose leading proponents are M.A.K. Halliday and Ruqaiya Hasan (cf. Hasan 1995:185-216; 1999:219-225), and the other which is associated with Jim Martin, Eija Ventola and some others (cf. Martin 1992:493-508, 546-73; 1997:6-18; 1999:25-40; 2001:287-90, 318-21; Eggins & Martin 1997:234-43). It will be the latter model, termed 'Register and Genre Theory', which is assumed throughout this paper. Register can be thought of as the characteristic language which is used in a specific situation. Genre is a broader category in at least two respects—for one, it includes the social purpose to which this kind of language is put. (The other—structure—is omitted from consideration here.) The diagram in Figure 1 (overleaf) represents the two dimensions under discussion by showing the genre label on the left as including both register and purpose.

Each of these two divisions is theorized in very different ways. In Systemic-Functional theory, register is systematized by the three main functions ('metafunctions') of language. The ideational or representative metafunction is realized as the field of some kind of language, its social process—crudely, its 'subject matter'. The interpersonal metafunction is realized as the tenor of language, bespeaking the relations between speaker and hearer. The textual metafunction is realized as the mode of language: broadly speaking, its text-forming properties, which are contingent on the choice of medium. Register categories field, tenor and mode are realized in configurations of lexico-grammar, for example, field-specific lexis (Gregory & Carroll 1978:27-63).

Purpose is theorized in terms of different types of intentions, genre categories, and text types. It is an open-ended system whose limits are contingent on the configuration of culture and social accessibility. Figure 1 enumerates a few intentions, genre categories, and text types which are particularly relevant to this paper, e.g., genre labels narrative, description, exposition, dialogue and monologue.

GENRE	REGISTER	Metafunction:	Register category:	Lexico-grammar:
		Ideational	Field	specific lexis nominalization
		Interpersonal	Tenor	colloquialism textual ellipsis
		Textual	Mode	lexical density turn-taking
	PURPOSE			
		Intention:	Genre category:	Text type:
		relate	narrative	novel
		depict	description	travel brochure
		explain	exposition	article
		discuss	dialogue	conversation
		declare	monologue	oration

Figure 1. Components of genre and register.

The lexico-grammatical realization of register types has been studied statistically in the work of Douglas Biber (Biber 1988; 1995). His studies use a multi-dimensional technique which involves probabilistic correlation among multiple variables for each of several text types (termed by him ‘genres’, 1988:70, 170). His main purpose is to define quantifiably what Register-and-Genre theorists term ‘text types’ (cf. Martin 1992:571–73) by identifying the relative distribution of lexico-grammatical features which realize the register side of the named types.

This paper describes three investigations which differ from Biber’s approach in several respects. First, instead of studying a corpus of different text types, these investigations have computationally analyzed a micro-corpus consisting of a single specimen of a single text type divided into micro-genres. The text type is 19th-century English novel, and the micro-genres are the five genres referred to above. Secondly, the micro-genres have been analyzed only for isolated variables, specifically iterative density and lexical density. Thirdly the purpose has not been to define text types, but to determine the roles which just these variables play in the different micro-genres of a continuous text, and to see how they inter-relate. These investigations have also revealed how significant stylistic variation can be detected from measurement of the two variables, and how the register categories field and mode are relatable through lexical realization.

2. ITERATIVE DENSITY IN A 19TH-CENTURY NOVEL. The first study, which has already been fully reported in a LACUS Forum (Cummings 2001), sought to answer these questions: a) how does iterative density relate to micro-genre in a continuous text and b)

how does variation in iterative density correlate with stylistic variation within a single micro-genre such as narrative? Iterative density is here defined as the ratio of lexical or grammatical tokens referring to the same referent (or class of referents) within a given span divided by the number of words in the span. The iterations represented by either lexical items or pro-forms would constitute identity chains (Halliday & Hasan 1986:83-84). The continuous text chosen for a micro-corpus of micro-genres was Dickens' *Oliver Twist* (Project Gutenberg 1996). The computerized method of analysis produced a count of the number of lexical repetitions and pro-forms in each consecutive section containing just 100 lexical items and pro-forms, and a report of the result for each section as a percentage. The sections were then reordered on the basis of increasing density from lowest to highest, and sample groups of contiguous sections were taken at regular intervals through the spectrum of densities for genre analysis. Each section in the sample groups was then labelled for the genre it represented from the five types: narrative, description, exposition, monologue and dialogue.

The results in tabular form correlated the genre type with number of sections possessing that genre label in each of the successive sample groups. For example the data confirmed the intuition that the highest number of narrative sections for any sample should occur within the sample with the lowest iterative densities, and that the highest number of dialogue sections for any sample should occur within the sample with the highest iterative densities. The data suggested a cline of genre types in which narrative and dialogue stood at opposite ends of the density spectrum, with description, exposition, and monologue in that order in between. More important, the spectrum of density variation within each genre type permitted stylistic comparison of sections with extremely high or extremely low densities. Extreme low-density narrative sections were seen to possess a multiplicity of participants for assignable stylistic reasons, in contrast to extreme high-density narrative sections with relatively few participants, and sometimes taking on other characteristics of dialogue depiction.

3. A SECOND APPROACH TO ITERATIVE DENSITY. Some of the limitations on the method just outlined have led to a second investigation of the same micro-corpus of micro-genres. One limitation stems from the computer's mechanical segmentation of the text, which produced many segments with internal genre boundaries. Furthermore the sampling procedure produced results which could only be heuristic. A procedure which overcomes these limitations involves hand-coding the text for micro-genres first, before the computer analysis. The human coder separates each successive stretch of text in the novel which is consistently one genre type from the next by inserting a bracketed label representing that genre type. The revised computer program then counts the number of tokens representing iteration in each such segment, and the total number of tokens in the segment which are potential for iteration, i.e., all the lexical items and pro-forms. The iterative density of the segment is represented as a fraction consisting of the number of iterations over the number of lexical items and pro-forms.

One important result of this revision is to produce data not for samples but for the entire population of generically labelled segments. For example, the mean values for

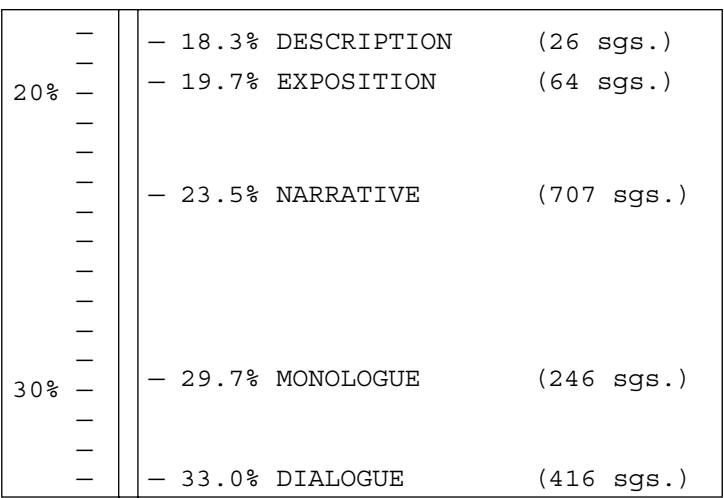


Figure 2. Mean iterative densities for genres.

iterative density in each of the micro-genres are calculated by the computer for the whole novel. The result revises the ranking of genres in a cline which was suggested by the previous study. Figure 2 shows that the mean values of iterative densities range from 18.3% for description to 33.0% for dialogue, with exposition, narrative, and monologue in that order in between.

Another kind of data derived is an ordering of the densities of individual segments from low to high for each of the micro-genres. From this output a histogram is prepared for each micro-genre which shows that at least in the case of the micro-genres with the greater populations, i.e., narrative and dialogue, with the densities grouped by equal ranges, the numbers of segments in each range approximate a normal distribution. Figure 3 offers such a histogram for narrative in which the grouping is from 0–2% range through 74–76% range, and the length of the bar represents the numbers of segments in each range. The curve thus suggests that the mean value for iterative density in this micro-genre is actually representative.

An important result which follows is confirmation of the suggestion that segments with extremely variant densities, if large enough, are also extremely variant stylistically. The computer output can be used to detect such passages in the whole population by identifying segments of appreciable length which belong to the extreme ends of the whole range of values for iterative density in any one micro-genre. A case in point is segment #1445, with a density of 27.6%, well above the mean value for narrative, and actually the longest continuous narrative segment in the novel. This turns out to comprise about 2/3 of the penultimate chapter, which depicts Fagin’s trial and subsequent incarceration until the day of execution. Its high iterative density appears to be connected with the technique of maintaining a continuous focus on the prisoner himself, who is introduced at the beginning of the chapter by name, but referred

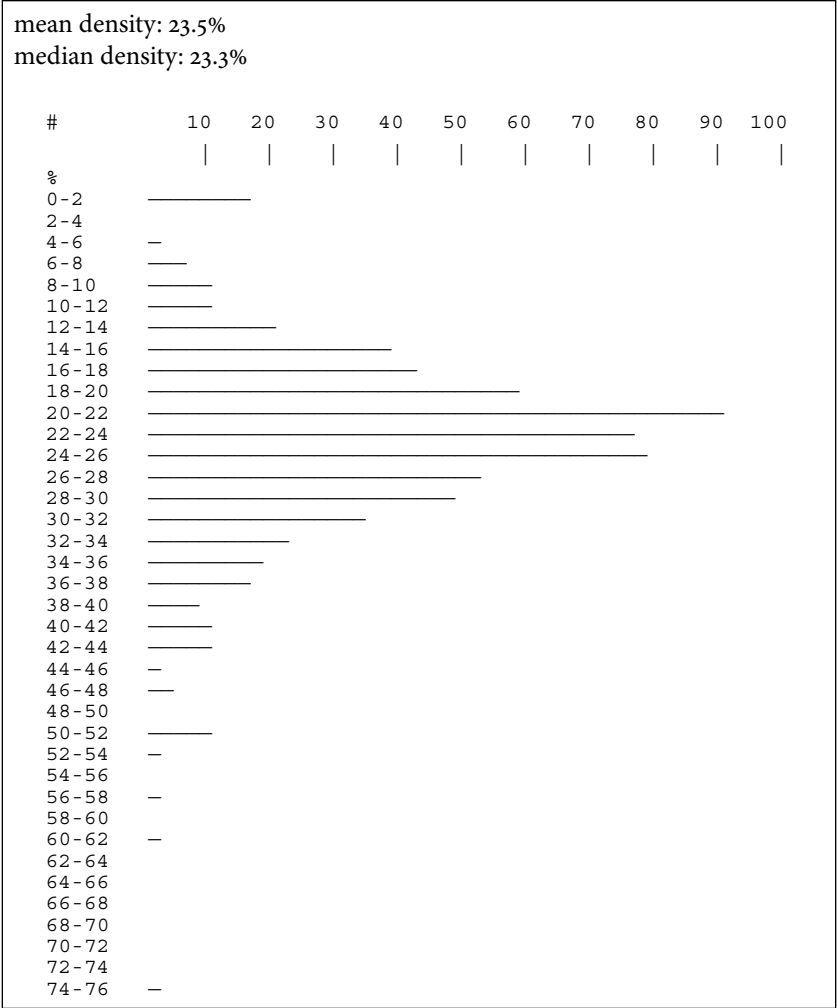


Figure 3. Narrative: densities against number of segments.

to repetitively and at frequent intervals for pages thereafter with pronoun forms in a long referential identity chain. This device forms part of the narrator’s successful conveyance of the prisoner’s social and psychological isolation. (For a more detailed treatment of this investigation, see Cummings forthcoming.)

4. LEXICAL DENSITY AS AN INDEX. The third investigation of the same text, *Oliver Twist*, moves on from iterative density to the more familiar concept of lexical density. These two measures are obviously relatable. In principle, iteration in a text could be effected solely through lexical repetition. But on the whole, most iteration in texts is

40% —	— 40.1% DIALOGUE (416 sgs.)
	— 40.5% MONOLOGUE (246 sgs.)
41% —	
42% —	
43% —	— 43.0% NARRATIVE (707 sgs.)
44% —	
45% —	— 45.4% EXPOSITION (64 sgs.)
46% —	— 46.2% DESCRIPTION (26 sgs.)
47% —	

Figure 4. Mean lexical densities for genres.

accomplished by pro-forms. From this factor, lexical density will tend to be inversely proportional to iterative density. However, lexical density is factored not only by pro-forms but by grammatical items of whatever sort. The degree of inverse proportion between lexical density and iterative density will therefore be very hard to predict. Some of the questions this final study was designed to answer are: a) can lexical density also be related to micro-genre in a continuous text, b) does variation in lexical density also correlate with stylistic variation within a single micro-genre like narrative, and c) can lexical density illuminate the relationship between very lexis-related register categories, that is, between the categories field and mode?

To answer these questions, a computerized method for measuring lexical density was devised along the same lines as that for iterative density. Lexical density can be defined in more than one way (cf. Halliday 1986:64–67). Here it means simply the number of single-word lexical items in a stretch of text divided by the number of words in the stretch, and is therefore expressed as a percentage. The computer program matches the words in the text against a table of grammatical items. Word items that don't match with the table are counted as lexical. Each segment of the input text labelled with a genre tag is relabelled with a serial number, the genre, and a fraction representing the total number of lexical items over the total number of words in the segment. The computer then derives a mean value for the lexical density of each of the five micro-genres in the novel taken as a whole by summing the numerators and denominators and dividing.

The output of this procedure is in several stages. The whole coded text of the novel is output again in a rewritten form. That is, first, all of its lexical items have been marked with asterisk for inspection. Second, its bracketed coding has been augmented by the numerical data just referred to. Another kind of output is a table

of mean lexical densities for each of the micro-genres, similar in form to the table for iterative densities in Figure 2. The new table — in Figure 4 — shows that, as foreseen, the ranking of micro-genres by mean values for lexical densities is inverted from the ranking of mean values for iterative densities: the mean lexical densities are distributed from dialogue at the lowest value of 40.1% to description at the highest value of 46.2%. A third kind of output, also similar to an output in the investigation of iterative densities, is an ordering of the lexical densities of segments from low to high for each of the micro-genres. Once again a histogram for each micro-genre is prepared from this output to show that at least in the case of the micro-genres with the greater populations, i.e., narrative and dialogue, with the densities grouped by equal ranges, the numbers of segments in each range approximate a normal distribution. Thus, once again, the mean value for density in such micro-genres is demonstrated to be actually representative.

5. LEXICAL DENSITY AS A STYLISTIC VARIABLE. To answer the second and third questions above, the stylistic implications of this data should be viewed in connection with the register categories field and mode. Once again the computer output can be used to detect passages which are stylistically marked, this time by identifying segments of significant length which belong to the extreme ends of the whole range of values for lexical density in any one micro-genre. Systemic-Functional linguistics has long noted a correlation of lexical density with variation in the register category mode. The modes of written English and spoken English make for different kinds of complexity. The complexity of spoken English is a grammatical complexity, and written English has a higher lexical density by contrast (Halliday 1994:349-352). But lexis is also a crucial index within the register category field. Among the various characteristics of field is field articulation, that is, the degree to which the field of a text is specified. Realization of such articulation lies with the taxonomic relationships, especially hyponymy and meronymy, among the lexis of the text. A high degree of articulation in the lexicalization of text will necessitate a high lexical density. The opposite need not be true, but extreme variations in lexical density from the mean values could be a clue to extreme contrasts in field articulation.

One way of demonstrating this is by working out the field taxonomy of the lexis within some passage whose lexical density represents an extreme variation from the mean value for its micro-genre. The passage (in output format) quoted in Figure 5 (overleaf) belongs to segment #617 which is narrative micro-genre, having 137 lexical items within a total wordage of 270—for a lexical density of 50.7%. This part of the segment has only 87 lexical items within a total wordage of 169—for an even higher lexical density of 51.5%. It describes a foot journey by Oliver Twist and Bill Sikes through the suburbs of London, and owes its variance from the mean value for lexical density to its method of describing the scene passing by in both time and space (cf. Cummings 2001:170).

The field taxonomy of the lexis in this passage is presented diagrammatically in Figure 6, in which lexical forms (or in parentheses hypothesized semantic categories)

by the *time they had *turned into the *bethnal *green *road, the *day had *fairly *begun to *break. many of the *lamps were already *extinguished; a few *country *waggon were *slowly *toiling on, towards *london; now and then, a *stage-*coach, *covered with *mud, *rattled *briskly by: the *driver *bestowing, as he *passed, an *admonitory *lash upon the *heavy *waggoner who, by *keeping on the *wrong *side of the *road, had *endangered his *arriving at the *office, a *quarter of a *minute after his *time. the *public-*houses, with *gas-*lights *burning inside, were already *open. by *degrees, other *shops *began to be *unclosed, and a few *scattered *people were *met with. then, *came *straggling *groups of *labourers *going to their *work; then, *men and *women with *fish-*baskets on their *heads; *donkey-*carts *laden with *vegetables; *chaise-*carts *filled with *live-*stock or *whole *carcasses of *meat; *milk-*women with *pails; an *unbroken *concourse of *people, *trudging out with *various *supplies to the *eastern *suburbs of the *town.

Figure 5. *Extract from narrative segment with very high lexical density.*

are nodes in a taxonomic tree based on relations of hyponymy and meronymy. The lexis of this passage specifies its field in the sense that the field is not just 'foot journey into London', but 'foot journey into London along the Bethnal Green Road taken by Oliver Twist and Bill Sikes as they meet up with shops, pubs, wagons, coaches, carts, labourers, peddlars, and so forth.' At its most general, the field is specified as time and space. Space as such is not directly lexicalized, but implied by the lexical antonymy of 'country' and 'town'. Country and town are not of equal significance because country is not further specified, while town is further specified in the taxonomic tree to a depth of eight more levels.

Figure 6 represents a field specification which is extreme in both the depth and the breadth of its taxonomic realization. This can be appreciated by contrasting with it the field specification taxonomy of another passage, just as extreme in the opposite direction. Figure 7 (overleaf) quotes segment #1205 of dialogue micro-genre with 65 lexical items in a total wordage of 208. The size of the passage is 23% greater than that of the foot-journey passage, but its lexical count is 25% less. Its lexical density is 31.25%. In this passage Fagin begins his recruitment of the two characters from Oliver's past, Noah and Charlotte. As characteristic of dialogue style, it is full of pro-forms and lexical repetitions.

The taxonomy for this passage is represented in Figure 8 (overleaf). The taxonomy reveals that the passage is not all that undifferentiated. It has at one point a depth of six levels, since Fagin is by implication one of the 'people' of the 'house' which is a 'safer place' than many others in the 'town'. However a comparison with the structure of the foot-journey passage reveals that this passage is extremely lacking in lexical agnation—there just aren't that many participants. We could have guessed that it would be underspecified even for dialogue. It is markedly less specified in comparison with the extremely well-specified narrative passage.



Figure 6. Articulation of field in high density narrative segment.

‘don’t *mind me, my *dear,’ *said *fagin, *drawing his *chair *closer. ‘ha! ha! it was *lucky it was only me that *heard you by *chance. it was very *lucky it was only me.’

‘i didn’t *take it,’ *stammered *noah, no *longer *stretching out his *legs like an *independent *gentleman, but *coiling them up as well as he could under his *chair; ‘it was all her *doing; yer’ve *got it now, *charlotte, yer *know yer have.’

‘no *matter who’s *got it, or who did it, my *dear,’ *replied *fagin, *glancing, nevertheless, with a *hawk’s *eye at the *girl and the two *bundles. ‘i’m in that *way myself, and i like you for it.’

‘in what *way?’ *asked mr. *claypole, a little *recovering.

‘in that *way of *business,’ *rejoined *fagin; ‘and so are the *people of the *house. you’ve *hit the *right *nail upon the *head, and are as *safe here as you could be. there is not a *safer *place in all this *town than is the *cripples; that is, when i like to *make it so. and i have *taken a *fancy to you and the *young *woman; so i’ve *said the *word, and you may *make your *minds *easy.’ [1205 dia 65/208]

Figure 7. Dialogue segment with very low lexical density.

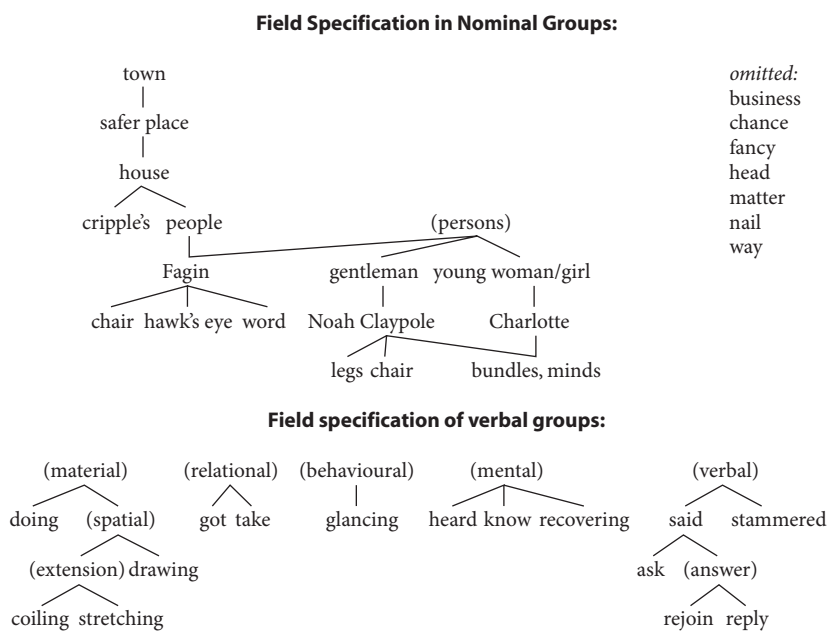


Figure 8. Articulation of field in low density dialogue segment.

All the above questions are therefore answered in the affirmative—like iterative density, lexical density can serve as a characterizing index for micro-genres, and as an index for stylistic variation within a single micro-genre. It is also a crucial factor in the relationship between register categories field and mode, insofar as a high degree of articulation of the field implies a similar degree of lexical density.

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POLITENESS IN IMPERATIVES: GRAMMATICAL ENCODING AND MEANING FROM A CROSS-LINGUISTIC PERSPECTIVE

INGA B. DOLININA
McMaster University

THE BASIC PRINCIPLE OF POLITENESS is a prohibition on imposition (Lakoff 1973, Leech 1983, etc.). The prescriptive meaning of the Imperative violates this principle. Linguists (Brown & Levinson 1987, Goffman 1967, Fraser 1990, Kasper 1990, Leech 1983, Marquez Reiter 2000, etc.) have discussed discourse strategies which help a speaker to moderate (or reinforce) the pressure of an Imperative or other Directive. Published studies of politeness pay little attention to its grammaticalization. Such studies usually discuss pragmatic strategies of using 'polite words' or non-Imperative constructions with the function of a Directive (questions, tags, modal constructions). Linguists who discuss the question of grammaticalization generally claim that in language politeness is not a matter of language structure, but only of the use of language. This statement is completely wrong, since lots of languages mark politeness grammatically. Little has been done to identify the semantics behind the grammatical encoding of politeness.

In this paper I analyze the grammatical mechanisms of encoding politeness in Imperative constructions cross-linguistically. My analysis is based on data from Sadock & Zwicky (1985), Bybee (1985), Khrakovskij (1992) and Mithun (1999), on a number of descriptive grammars, and on data from informants. Khrakovskij (1992) is especially important, because it is a cross-linguistic study based on a uniform questionnaire in which the existence of politeness forms was one of the specific questions. Cross-linguistic data show that, contrary to the claims of some linguists, politeness in the Imperative (actually in other speech acts as well) is not merely a discourse strategy belonging to pragmatics, but is also part of the structure of languages.

It is a linguistic universal that all languages have special mechanisms (whether purely pragmatic or grammatical) for expressing politeness in the Imperative. But I argue that these mechanisms vary from language to language. These variations are especially clear in languages where politeness in the Imperative is marked grammatically—by specialized morphemes, auxiliaries or particles, or by the shifted/secondary usage of some grammatical categories. Not only do types of grammatical mechanisms differ across languages, but the meanings which they convey clearly demonstrate that what is perceived as politeness is often language-specific. Analysis of the grammatical forms encoding politeness enables us to distinguish the semantic areas associated with politeness cross-linguistically.

The study of mechanisms of encoding politeness (affixes, function words, etc.) can in fact offer more precise insights into the semantic nature of politeness than such concepts as face, hierarchy, power, etc. The grammatical items which mark politeness

usually do so in a secondary function, and their primary function usually has a rather transparent semantics. This allows us to reconstruct the semantic trajectory leading to the formation of the secondary (politeness) meaning. What is particularly interesting is that the initial concepts associated with politeness cross-linguistically are diverse. From this perspective an old dispute about whether politeness is universal or culture-oriented can be dealt with on new grounds. Politeness as a social demand of interaction is universal, but what is qualified as such is to a large extent culture/language specific.

I offer in this paper a taxonomy of the meanings I have encountered in mechanisms in different languages for encoding politeness in the Imperative. I do not claim that this taxonomy is exhaustive. But whatever mechanism is used to encode politeness in the Imperative, its goal is to moderate the pressure of an Imperative, which in itself violates the prohibition on imposing oneself on someone else, i.e. the basic principle of politeness.

1. PRELIMINARY NOTES.

1.1. ILLOCUTIONARY FUNCTIONS OF DIRECTIVES/IMPERATIVES. Imperatives are linguistic actualisations of a speech-act Directive, with three major functions: ordering, requesting, advising. Ordering may in turn take the form of ordering, commanding or demanding (see discussion in Hamblin 1987:44). The cross-linguistic tendency is not to mark grammatically the distinction between these functions—they are recognized within the speech-event. But still this distinction can be marked explicitly. Thus in Vietnamese AUX *nên* is used to mark advice/request, (1)a, and AUX *phải* to mark command, (1)b:

- (1) a. *Ông nên đi.* 'You ought to go'
 b. *Ông phải đi.* 'You have to go' (Nguyen-Dinh-Hoa 1968:122)

Similarly, in some constructions in Korean commands are formed by the AUX *ha-da* (from 'to do'), used when the speaker has the power to command, and requests by the AUX *ju-da* (from 'to give'), when the speaker asks for a favor.

In Russian this difference is optionally marked by placing in request/advice the pronominal subject *ty/vy* (2SG/PL) in post-verbal position. In a basic Imperative construction (which is functionally ambiguous and refers to both commands and requests, depending on the context) the Addressee is rare and, if expressed, is pre-verbal. Compare (2)a, with the undifferentiated meaning of a Directive, and (2)b, with the meaning of request/advice:

- (2) a. *Pročti etu statju!* 'Read (2SG) this article!'
 b. *Pročti ty etu statju!* 'Read (2SG) **you** (2SG) this article!'

1.2. SCALAR NATURE OF POLITENESS. I propose to regard politeness as a scalar phenomenon which in the context of a second person Imperative conceptually can be

organized around three points on an axis. A central/basic point represents a straightforward Imperative/Directive and has neutral-politeness meaning. Increase of politeness involves reduction of pressure from the Speaker (S) on the Addressee (A)/Doer (D). Decrease of politeness either involves rudeness or represents another deviation from the norm—'a-politeness', which is associated with emergencies.

Special marking mechanisms can potentially actualize all of these possibilities, but usually marking mechanisms make only two of the oppositions explicit: norm vs. increase of politeness, or norm vs. decrease of politeness. In this paper I will discuss predominantly mechanisms marking reduction of pressure, i.e. an increase of politeness.

2. REDUCTION OF PRESSURE. The Imperative has a complex semantic structure (Dolinina 2002). It actualizes three situations (appellative, causative/volitional and the content proposition) and a 'framing-framed' relation. The appellative situation involves the S addressing someone (A), the causative/volitional situation involves S expressing a wish that someone (D) do something or causing that person to do it, the content situation is the proposition which is the content of what S wishes/causes to be done. The framing-framed relation is the relation between S and the proposition, this proposition names not an actual situation, but only a prospective one.

Each of the three situations has its own predicate and arguments. The arguments of the three situations are generalized into the three abovementioned macroroles: S, A, and D. Data suggest that politeness of an Imperative can be directed to each of the components of an Imperative situation. With respect to the participants it can actualize the level of respect towards any of S, A, or D. With respect to the predicates it can change the level of pressure in terms of modality and similar concepts; thus it can replace causation by mere volition, replace factitive causation ('make someone do something') by permissive causation ('let someone do something'), lower the level of deontic modality/obligation ('can' instead of 'must'), or loosen the level of epistemic modality/probability (not a regular Imperative form, but Subjunctive, Irrealis, etc. forms of the verb).

Thus politeness in the context of an Imperative is a multi-faceted phenomenon from the point of view not only of the amount of reduction of pressure, but also of those components of the Imperative situation with respect to which pressure is reduced.

The Imperative has an inherent semantics of strong interference into the personal space of an A/D. Its goal is not just to attract A's attention (which is the goal of any direct speech act), but to cause D to perform an action. So S violates first of all the 'negative face' of A/D, i.e. the absence of unwanted intrusions into the person's privacy, both by addressing A and by attempting to cause D to do something. To counterbalance this damage, some politeness strategies are directed at raising the 'positive face' of A/D, i.e. the recognition by S of A/D's status. Other politeness strategies are directed at lowering the degree of interference into the negative face by lowering the level of causation. I shall show how these pragmatic strategies are encoded grammatically in Imperative constructions cross-linguistically. The grammatical encoding shows that

at least three major semantic dimensions can be distinguished: face-related devices, lowering of deontic pressure, and lowering of epistemic dimensions.

3. FACE. Face-preserving strategies are diverse. I distinguish the following major types, each with subtypes.

3.1. RESPECTIVITY. Respectivity (the term itself goes back to Xolodovič 1979:58) is to my understanding an umbrella concept which includes two different ways of honouring the addressee, either by using honorifics or by treating the addressee as representing a group. In the Imperative, respectivity can be expressed in the direction of all the participants, S, A, and D. In the most languages it is directed toward the A. In cases when it is directed toward the speaker (as in Japanese or Russian), it evidently aims to demonstrate that S has legitimate power/status to issue a Directive, and thus it is not damaging to the face of A to take orders. I will not discuss this type in my paper.

When respectivity is directed toward the addressee, it is aimed to counterbalance the damage to the negative face by elevating the positive face. S indicates respect for the A/D of the action. This type of politeness represents social etiquette more than individual politeness, since non-usage of proper forms will be perceived as intentional rudeness (using a lower form), or social/cultural ignorance (using an unapproved or ironic form), but not as a neutral directive. Standard marking mechanisms of respectivity are either a specialized status-relevant affixation on the verb (the most prototypical examples are found in Japanese and Korean) or a change of number-value on the verb and/or the pronominal subject, in which one replaces singular forms by plurals in addressing one individual. sometimes the person value is changed (e.g. from second to third, as in Polish).

3.1.1. HONORIFICS. In languages with recognized honorific systems this type of politeness is encoded by a system of specialised markers on the verb. The number of affixes activated in honorific oppositions varies from five or more (e.g. Japanese, Korean, etc.) to one (e.g. Uzbek, Tagalog, etc.). Honorific markers reflect recognition of a social hierarchy between individuals within a group. In some cultures/languages this is strictly fixed and cannot be arbitrarily changed by the speaker without producing either an effect of rudeness or a comical effect.

3.1.2 PLURALS. Another mechanism marking respectivity is the replacement of SG forms of the verb (and of pronouns, if they are included in the imperative construction) by PL forms:

- (3) German: *Gehen Sie!* 'Go (3PL)!' French: *Allez!* 'Go (2PL)!'

Here I think another semantic opposition is in effect: individual vs. group. Politeness consists in raising the positive face of A by treating him not as a single individual, but as a group. This interpretation finds support in the way other languages develop

an encoding of respectivity. Thus in Yuma imperatives the number-values (SG, DL, PAUC, and PL) of A are normally marked by different pronominal prefixes on the verb, but in some cases this differentiation is suppressed and agreement with A is marked by a prefix *na-/ŋa-*. Foley (1991:270) interprets this shift as neutralization of the plural prefix *naŋ-*, assumes that this encoding change can reflect politeness phenomena, and remarks that it is often used when addressing a group of people. Something similar happens in Nama Hottentot, where politeness is marked by addition to the imperative construction of a final particle *-rè*, which makes a command more polite and is often used in addressing a group. Compare (4)a and b:

- (4) a. *saáts-à* *mùũ!*
 you(M:SG)-SBD see
 'See!'
 b. *saáts-à* *mùũ* *rè!*
 you (M:SG)-SBD see PLT!
 'See (PLT)!'
- (Hagman 1977:146)

Some languages can combine honorific marking with plural marking of a singular subject, as in Tagalog (5) which supports my interpretation of honorifics and plurals as autonomous entities.

- (5) *Tatay, magkuvento nga po kayo!*
 Father, tell please **HON** **2PL**
 'Father, tell me, please (a tale)!'
- (Rachkov 1992:241)

3.2. ANONYMITY OF ADDRESSEE (POLITE). Some languages (e.g. Austronesian) use as markers of politeness passive constructions in which the subject of the imperative correlates with the Patient of the proposition, not with its Agent To explain this mechanism I conjecture that in this case there is a semantic shift from causation to wishfulness: a straightforward Directive (with an imposition on a person to do something) is camouflaged as an expression of just a wish, giving the impression that the event in question will be accomplished as if on its own and that there is no causation at all.

But the politeness meaning of passive constructions is language-specific. In other languages, on the contrary, the passive construction can be quite a rude form of Directive. In Russian a passive construction is quite rude, even for an order:

- (6) *Chtob bylo sdelano!* lit.: 'That it be done!' 'Must be done!'

Such contradictory effects can be explained as follows. Excluding a reference to A/D takes out the possibility of recognizing the importance of A, which can be at the heart of politeness. So if the construction is understood as a shift from causation to just an expression of a wish, it is perceived as polite, but if it is understood as ignoring A/D, it is perceived as rude.

Manaster-Ramer (1995), discussing the politeness value of passive constructions like (7) in Malagasy, claims that such constructions are perceived as polite only historically, but not at present. Contemporary speakers evaluate them as 'quite rude'.

- (7) *Antso -y izy*
 call PASS.IMP he
 'Call him!' (Manaster-Ramer 1995:205),

3.3. 'COURTING' THE ADDRESSEE: EXPRESSION OF APPRECIATION FOR COMPLIANCE.

3.3.1. COAXING INTO ACTION. In Aleut (Golovko 1992) the affix *-k̥uza* is used to mark politeness in the Imperative. This affix in its primary usage is a nominal diminutive but in imperative constructions it is used as a verbal affix. Compare the basic construction in (8)a and polite in (8)b.

- (8) a. *saga-da!*
 sleep-IMP
 'Sleep!'
 b. *haka -k̥uza -da*
 come-up -DIM/PLT -IMP
 'Come up, please!' (Golovko 1992:161, 166)

One can speculate that politeness here has developed semantically from an expression of tenderness towards A, in order to coax him into acting. Something similar exists in Russian, where a diminutive nominal/adjectival affix *on'k/an'k/jen'k* can be combined with a very few verbs to produce a coaxing effect, usually in dealing with small children, patients, etc., as in (9):

- (9) a. *Kush -aj!*
 eat -IMP:2SG
 'Eat!'
 b. *Pokush- an'k -aj!*
 eat -DIM/PLT -IMP
 'Eat, please, (dear darling)!'

The effect of this component is similar to the initial meaning of *please*, which in most languages etymologically goes back to verbs with the meaning 'confer pleasure'.

3.3.2. ADDRESSEE PARTICIPATES IN DECISION MAKING. This way of encoding politeness also marks grammatically the recognition by S of A's importance. It does so by inviting A's participation in decision making. Thus Palauan has a special prefix *ka-* which signals that the speaker wants to involve A in the decision about performing the action; for this reason, this affix is never used with exclusive forms ('we without you'). Addition of the affix changes a strong imperative (10)a into a mild suggestion (10)b:

- (10) a. *Molim a kërur!* 'Take your medicine!'
 b. *Kamolim a kërur!* 'How about taking your medicine!'

(Josephs 1975:110)

3.3.3. ADDRESSEE UNDERSTANDS/ACCEPTS THE TASK. In Vietnamese (Nguyen-Dinh-Hoa 1968, Bystrov and Stankevič 1992) there is a sentence-final particle *nhé* which denotes that S makes sure that the order/proposal for action is acceptable to the hearer (11)a.

- (11) a. *Ông đi trước nhé!* 'You go on ahead, OK?' (Nguyen-Dinh-Hoa 1968:51)

This marker contrasts with some other particles which are lower on the politeness scale. Thus another Vietnamese Imperative marker, the particle *đi* (which goes back to a verb of directional movement to *disappear, to go away*) marks impatience or a strong expectation that the action will be carried out, and is used only when addressed to a person lower in a social hierarchy. Thus (11)b can be said by a mother to her son, but not by a host to his guest.

- (11) b. *ăn đi!* 'Eat!' (Bystrov & Stankevič 1992:249)

A function similar to (11)b is carried out in Russian by the particle *že*, which expresses strong impatience:

- (12) a. *Idi že!* 'Go!'
 b. *Chitaj že!* 'Read!'

4. CHANGE OF DEONTIC MODALITY. Politeness here is based on lifting the burden of strict obligation on A/D. Several semantic subtypes express this lightening; each is marked by a specialized form going back to a distinct semantic domain of its own. They are all based on the concept of simplifying the task which is to be carried out by A/D or reducing his effort.

4.1. PARTIAL EXECUTION OF AN ACTION. Eskimo has a specialized affix *-axt/-kag* which marks politeness in Imperative constructions with the implication that the A/D is not supposed to overburden himself in carrying out the action. The primary meaning of this affix in Indicative is to present the action as 'less prolonged/less intensive than normal' (Vaxtin 1992:96).

- (13) a. *atixtuġ-aķuṇa* 'I read'
 b. *atixtuġ-kaġ-aķuṇa* 'I read a little/for a while' (Vaxtin 1992:96)

Vaxtin compares these constructions to Russian ones with a somewhat similar meaning:

5. CHANGE OF EPISTEMIC MODALITY WITHIN THE PROPOSITION. Politeness here seems to be a function of S lowering verbally the probability that the event will actually happen. For this purpose languages make use of shifts in Mood/Tense usage. If a basic imperative construction uses a straightforward Imperative form, 'polite' imperative constructions are encoded by use of Subjunctive (e.g. Italian), Optative (e.g. Aleut) or Future Indicative (e.g. Hebrew) verb-forms in the function of Imperative. This is a widely used device, present in most language families. Mithun (1999:179) cites Jamul Diegueño (from Miller 1990:119), which has two options for Imperative—basic imperative and polite imperative with irrealis forms:

- (19) a. Strong: *k- nau!*
 2- run
 'Run!' (basic imperative)
 b. Polite: *m- rar- x- s*
 2- do- irrealis- emph
 'Do (whatever you want)!' (Polite)

Moses Columbia (Mattina 1999:13) uses Declarative to encode commands, strong instructions combining them with unrealized, future, or deontic markers. Though in Nama Hottentot (Hagman 1977:148) constructions involving declaratives with Future or indefinite tense markers can be interpreted as a mild obligation or suggestion, Russian uses declarative Future Perfective as a stronger Imperative than a basic one.

It is interesting that morphologically shortened Imperative forms/constructions—that is constructions with Infinitives instead of marked forms, or no verb at all (both in marked and unmarked Imperative constructions)—are strong Imperatives, usually used in orders/commands:

- (20) Russian: *Vstat!* 'Stand up!'
 English: *Up!*

In the Imperatives there is some iconicity between the length of the construction and the politeness parameter—the shorter the phrasing, the less choice for A/D. If these constructions are taken out of a recognized military or similar institutional context, they sound rude. A similar effect results from the Imperatives with syntactically demoted subject:

- (21) *Vs -em vsta -t!*
 all -DAT stand up -IFF
 Lit: 'All (dative) to stand up!'

6. INCREASE OF PRESSURE. Besides mechanisms elevating the level of politeness, there are 'a-politeness' mechanisms which neglect politeness (without signifying rudeness) and instead reinforce the pressure of a Directive. These are widely represented

cross-linguistically by two types of constructions: (1) 'Past Imperatives' and (2) Emphatic Imperatives.

The first use Past Perfective (or Perfect) forms which imply the immediate execution of an action by A/D:

- (22) *Begone! Be done!*
 Russian: *Vstali!* '(They) have stood up!'

The second emphasize the obligatory nature of the action: English AUX *do*, Chinese particle *yiding* 'sure', etc. Both mechanisms elevate the level of deontic modality, that is the obligation of A/D to carry out an action. It must be stressed that rudeness is different from a-politeness; it violates the component of respectivity, not the level of obligation.

7. CONCLUSION. Politeness in the Imperative is not merely a discourse strategy belonging to pragmatics. It is also a part of grammatical structure in numerous languages. Though expressing politeness is a universal capability of all languages, what is actually perceived as politeness differs cross-linguistically.

Investigation of grammatical mechanisms which serve to encode politeness in direct imperative constructions cross-linguistically enables us not only to distinguish the morphological and syntactic means used for this function (affixes, auxiliaries, particles, and Tense and Mood categories), but also to outline the taxonomy of meanings which represent politeness more precisely than just in terms of 'face'.

Because markers of politeness are used in a secondary meaning, whereas their dominant meanings are semantically quite transparent, it was possible to reconstruct the semantic trajectory leading to the formation of the secondary, politeness, meaning, and thus to distinguish and interpret different types of politeness meaning.

The strategies distinguished in this paper fall into three major semantic types: diverse strategies related to raising the positive face of the A/D (honorifics, plural marking, appreciation of compliance, participation in decision making, etc.), strategies aimed at lowering deontic modality in dealing with A's obligation to act, and strategies encoding a lowering of epistemic modality by presenting the actualization of an ordered/requested situation as only probable.

From this perspective an old dispute about whether politeness is universal or culture-oriented can be dealt with on new grounds. Politeness as a social demand of interaction is universal, but what is qualified as such is to a large extent culture- and language-specific.

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A STRATEGY OF PERSUASION IN CHINESE ADVERTISING: ENGLISH-BASED IDENTITY CONSTRUCTION

LIWEI GAO

University of Illinois at Urbana-Champaign

WITH ADVERTISING BECOMING MORE AND MORE PERSUASIVE¹ in, and also an integral element of, contemporary society, research on advertisements grows progressively important. Nevertheless, even though there has been much research that investigates a variety of aspects of advertising (e.g. Cook 1992, Dyer 1982, Geis 1982), documentation on advertising that examines its strategy of persuasion is disproportionately rare. This paper attempts to fill this gap by examining one of the strategies of persuasion in Chinese-English bilingual advertisements—identity construction. It argues that constructing favorable identities for targeted customers, or ‘narratees’ (Goddard 1998), serves as a powerful strategy of persuasion.

Most Chinese advertisements draw heavily on linguistic strategies for the purpose of persuasion, which include the use of various rhetorical devices (e.g. Han 1991, Zhang 2001). This paper examines one of the linguistic strategies, the use of English. It argues that among various linguistic tactics that serve as strategies of persuasion, the use of English functions as a prominent one. By casting the ‘narratee’ as one who knows English, multiplex social identities are constructed, identities which are all attractive alternatives to the ‘implied reader’ (Piller 2001), a young-to-middle-aged, educated and/or well-off Chinese in most cases².

This paper first conducts a review of literature that shows that persuasion is a predominant function of advertising and, above all, that identity construction is central to advertising as part of its function of persuasion. It then presents the theoretical framework with which language use and identity construction are argued to be closely intertwined. Next, after a brief introduction to the data, the paper analyzes the construction of different kinds of identities through the strategic use of English in Chinese advertisements. The paper concludes with a discussion of the significance of this study.

1. PERSUASION IN IDENTITY CONSTRUCTION IN ADVERTISING. Persuasion is a pragmatic function that plays a prominent role in people’s daily interaction with other people, the ultimate goal of which is to make somebody do something or not do something (Aubuchon 1997). Compared with command or negotiation, both of which are also means by which people are made to do or not to do things, persuasion is usually deemed a better way of achieving one’s goal. According to Aubuchon (1997:3), ‘persuasion is that quiet, unforced power that can move heaven and earth’³.

1.1. PERSUASION IN ADVERTISING. The word *advertisement* has the root *advertere*, a Latin verb with the meaning ‘to turn towards’. This reveals advertising’s essential

nature of persuasion. Different researchers define advertisements from different perspectives, although, as is expected, different definitions overlap in one way or another. According to Covino (1998), advertising is the methodology by means of which the desire for better things is created among potential buyers. And quoting Harris and Seldon (1962:40), Vestergaard and Schröder (1985) define advertising as a public notice 'designed to spread information with a view to promoting the sales of marketable goods and services'. Most significantly, Goddard (1998:7) notes that central to the definition of advertisements is the factor of 'conscious intention behind the text, with the aim of benefiting the originator materially or through some other less tangible gain, such as enhancement of status or image'⁴.

Advertising is a preeminent type of discourse in the modern society. As is observed by Cook (1992), advertisements as a type of discourse are distinguished from other discourse types crucially in terms of the feature of function. Whereas the function of most advertisements is to persuade people to buy a certain product, other discourse types do not have this function. Advertisements' function of persuasion is also identified by other researchers (e.g. Gass & Seiter 1999, Geis 1998).

1.2. IDENTITY CONSTRUCTION AS A STRATEGY OF PERSUASION. Advertising must employ different strategies, for example, psychological and pragmatic strategies, to achieve the objective that targeted audiences should have favorable attitudes towards advertised products. The strategic use of language is also one such means. As is noted by Gass and Seiter (1999), the language that is used in communication affects the way messages are perceived. Linguistic strategies utilized in advertisements have already been documented. For instance, Goddard (1998) discusses the use of different typographical features, and Cook (1992) talks about the utilization of prosody and parallelism.

Concerning exactly what is the target of persuasion, social psychologists distinguish among attitudes, beliefs, and behaviors. According to Murchison (1935), attitudes are feelings about something, beliefs refer to the information that a person has about something, and behaviors are the actions that are, in one way or another, related to both attitudes and beliefs. Social psychologists hold that attitudes are usually the target of persuasion, since attitudes can direct and even predict behaviors. If this is true, advertisements must be capable of influencing or, if necessary, changing the attitudes of potential consumers towards advertised merchandise if they are to succeed in persuading people to buy. In other words, they must be able to secure favorable attitudes towards the product from the 'narratee'.

According to Garver (1994), the power of persuasion depends on the interaction among three different factors: (1) *ethos*, which refers to the speaker's personal traits, (2) *pathos*, which refers to the audience's emotions and states of mind, and (3) *logos*, which denotes the content of a message (the terms *ethos*, *pathos*, and *logos* themselves originate with Ancient Greek philosophers). The construction of attractive identities for the 'implied reader' aims at influencing his or her *pathos*. In other words, by creating such popular identities as being internationally oriented and success prone, the advertisement is designed to exert an impact on the emotions and states of mind of

the 'narratee' so that he or she can have a positive attitude towards, and even the desire to purchase, the advertised product⁵.

The present paper argues that if favorable identities for the 'narratee' may be constructed through the use of English, at least two factors are responsible: the special status of English in the minds of Chinese people on the one hand, and the association of English use with only certain types of messages on the other. English is the virtual international language today (cf. Crystal 1997). With the practice of the opening-up policy initiated by the Chinese government in the late 1970s, English defeated all other foreign languages in fighting for the linguistic market and consequently became the most popular foreign language in China. It has turned into the language that promises, among other things, job opportunity, upward social mobility, and social prestige. Moreover, in China English is usually closely connected with American culture. The use of English oftentimes reminds one of American people, who are modern, fun-oriented, etc. in the minds of most Chinese. Thus, a 'narratee's' knowledge of English helps him or her be construed as modern, successful, fun-oriented, etc. On the other hand, using English to express only certain types of messages, such as fun-oriented messages, also helps to construct identities for the 'narratee' that are consonant with these messages.

2. THEORETICAL FRAMEWORK OF LANGUAGE AND IDENTITY. Critical linguists, for example, Cameron (1994) and Fairclough (1989, 1995), hold that language is oftentimes used not only as a means of information communication, but also as a major tool of social construction, with the construction of social identity being part of it. Moreover, they argue that language often serves as a loaded weapon in the construction of a version of social reality that favors those in power. For instance, according to Fowler (1985:61), language is 'an instrument for consolidating and manipulating concepts and relationships in the area of power and control'.

With the assumption that linguistic behavior is social practice in the sense that it is a tool of social construction, many linguists (e.g. Eckert 1989, 2000; Gumperz 1982a; Harvey & Shalom 1997; Piller 2001) argue that, to a great extent, the relationship between language use and social identity is constitutive. For instance, Eckert (1989:vii) notes that on certain occasions the choice of a certain linguistic code has 'social symbolic significance', and consequently it is associated with 'the expression of social identity'. Furthermore, Eckert (2000:41) observes that 'the individual's engagement in the world is a constant process of identity construction'; in other words, people are continuously negotiating their 'meaning in the world'. Gumperz (1982a) also argues that people's choice of a language style may have symbolic value and interpretive consequences. Meanwhile, Gumperz (1982a:7) holds that social identities are largely 'established and maintained through language'.

3. ENGLISH-BASED IDENTITY CONSTRUCTION IN CHINESE ADVERTISING.

3.1. THE DATA. The advertisements analyzed in this paper are from a corpus of one hundred and thirty-six Chinese-English bilingual advertisements, which were collected

from both the electronic and the print media. The sources of the corpus are five Chinese web sites: www.sina.com.cn, www.sohu.com.cn, www.263.net, www.163.net, and www.chinaren.com; and five Chinese periodicals: «中国国青年» (*China Youth*), «中国国情国力» (*China National Conditions and Strength*), «今日中国» (*China Today*), «人民画报» (*China Pictorial*), and «大众电影» (*Popular Cinema*). Articles both on these web sites and in these magazines are written almost exclusively in English, though the intended readers are Chinese. Most of the online advertisements were collected in December, 2001, with a few also collected in April, 2002. Periodical advertisements were collected from issues published in 2000, 2001 and 2002.

For the purpose of representing maximally authentic advertisements, if possible, all the typographical features in the original advertisements are retained in the examples below. Moreover, Chinese characters are used in the specimens, with a gloss in English provided right below the Chinese text and a free translation in the end. However, to save space, the layout of some of the sample advertisements has been modified. In addition, for the same reason, none of the samples analyzed represents a complete advertisement, particularly if the original advertisement is lengthy. In this article, the use of English is defined as the inclusion of English texts not only in the main body of an advertisement, but also in the logo, the company's name, the brand name, or the company's web site.

3.2. DATA ANALYSIS.

3.2.1. AN INTERNATIONALLY ORIENTED IDENTITY. Piller (2001:153) notes that in the contemporary society the once dominant 'political identities based on citizenship' are gradually shifting toward 'economic ones based on participation in a global consumer market'. In other words, as a result of the ever-increasing globalization, an internationally oriented identity becomes the vogue, which is oftentimes admired and sought after. This is also true in China, especially among those young-to-middle-aged, educated, and/or affluent Chinese who mostly live in big cities. The advertisement in (1) exemplifies this craze. It not only features the use of the English abbreviation *HR*, but also the modifier 国际 'international'. Such a design implicitly associates knowledge of English with the image of being internationally oriented.

- (1) 国际 HR 专家 协会 主席 主讲
 international *HR*⁶ expert society chairperson lead the lecturing
- 国际 HR 职业 资格 证书 我 值得 拥有
 international *HR* profession qualification certificate I worth own

'The chairperson of the International Human Relations Experts Society leads the lectures. It's worthwhile for me to have the Certificate of the International Human Relations Professional Qualification.
 (<http://www.sina.com.cn>, December 22, 2001)

The advertisement in (2) advertises a cellular phone service, 全球通 'globe-wide communication'. It also combines the use of English, *GoTone*, the name of the service, with the feature of international orientation, as represented by the two modifiers 全球 'world-wide' and 国际 'international'.

- (2) 全球 通 GoTone 国际 漫游
 entire globe through *GoTone* international wander
 'The world-wide communication service, *GoTone*, enables you to freely make international phone calls.' (<http://www.sina.com.cn>, April 28, 2002)

The advertisement in (3) below, which advertises the Pacific Credit Card issued by China's Bank of Communications, is also characterized by the use of English on the one hand, which in this case is not limited to English lexicon, and the indication of the 'narratee's' internationally-oriented social identity on the other, which is suggested by the expression *Global Finance*. (The first three lines appear only in English.)

- (3) Best Bank Awards 1999
 Global Finance
 Bank of Communications Best Bank in China
 一 卡 在 手 消 费 不 愁
 (one card PREP hand consume not worried)
 'With this *one* card in hand, you don't need to worry about having no money to spend.' («今日中国» 2000:1)

3.2.2. A SUCCESSFUL OR SUCCESS-ORIENTED IDENTITY. A successful or success-oriented social identity is also constructed by the Chinese advertisement that uses English. Just like the construction of an internationally oriented identity, the construction of a success-oriented identity is partly accomplished through the use of success-related words or phrases. In (4), an advertisement for an apartment complex, the phrase 有骄人成就的优雅人士 'a leisurely and refined person with enviable achievements' portrays the 'implied reader' as someone who is very successful. And the use of the English word *home* implies that the 'narratee' has knowledge of English.

- (4) ... 公寓 与 公寓 是 不同的, *home* 与 *home* 也 是 不
 apartment and apartment be different *home* and *home* too be not
 一样的, 作 为 一 个 有 骄 人 成 就 的 优 雅
 same as one have proud accomplishment AUX elegant
 人 士, 当 你 的 *home* 被 来 客 初 次 造 访, 里
 person when your *home* PASS guest first time visit there
 的 环 境 会 说 话。
 AUX environment can speak

- (4) '...One apartment is different from another. One home is also not the same as another. As a leisurely and refined person with enviable achievements, when your home is visited by a guest for the first time, the environment will speak for itself.' (《中国国情国力》, 2001:4)

The advertisement in (5) also constructs the 'implied reader' as someone who is successful. In this case, this is realized not by using language that directly denotes the notion of success, but by using implicature. In China, only a small proportion of people can afford to travel by plane, and these people are often considered successful in their career. Those who sit in the *executive class* of a plane are usually viewed as particularly successful.

- (5) 宽敞 舒适 轻松 享受 日本航空
spacious comfortable relaxing enjoyable Japanese Airlines
'Spacious and comfortable. Relaxing and enjoyable. Japanese Airlines.'

JAL EXECUTIVE CLASS SEASONS
JAL EXECUTIVE CLASS SEASONS

(《人民画报》, 2002:1)

Using the expression 成功 'success', the advertisement in (6) constructs the targeted consumer as someone who is success-oriented. In this piece of advertisement, the corporation's name in English is presented right after its name in Chinese.

- (6) 勇于 创新 网际 人 的 信念
brave originality Internet people AUX belief

北京网际广告有限责任公司 BEIJING INTERNET ADVERTISING CO., LTD
Beijing Internet Ads Co. Ltd. BEIJING INTERNET ADVERTISING CO., LTD

我们 共同 成长, 共 有 收获, 共 享 成功
we together grow together have harvest together enjoy success

'Being actively creative is the belief of those who work in the Internet business. Let's grow together, harvest together, and succeed together – Beijing Internet Advertisement Co. Ltd.' (《中国国情国力》, 2001:2)

3.2.3. A FUN-ORIENTED IDENTITY. On many occasions the use of English in Chinese advertisements is also related to the creation of a fun-oriented identity, which is a mostly attractive alternative to young Chinese. In (7), the English word *HIT* is used to describe the advertised friend-making gadget, which has an English-like name, *Friengetys*.

- (7) 日本 青年 最 HIT 的 时尚 玩意 Friengetys
Japanese youth most HIT AUX fashionable toy Friengetys

- (7) 教友机
friend-making machine

'The most popular and fashionable gadget among Japanese youth – Friend-getys friend-making machine.' (《中国青年》, 2001:11)

The advertisement for the Chinese web site, <http://www.263.net>, in (8), which uses English side by side with Chinese expressions, is another sample that constructs the 'implied reader' as a fun-oriented person. In this sample the name of the web site contains the English word *net*, although the contents of this web site are mostly in Chinese.

- (8) 首都 在线 Capital Online www.263.net 自由自在
capital online *Capital Online* www.263.net leisurely and carefree

逍遥 梦 全家 上网 乐 无穷
free and unfettered dream whole family go online joy endless

'Capital Online at <http://www.263.net> can help you to realize the dream of being leisurely, carefree, and unfettered. With everybody in the family being able to do things at <http://www.263.net>, there will be limitless joy. (《今日中国》, 2000:7)

3.2.4. A MODERN AND FUTURE-ORIENTED IDENTITY. Some of the Chinese advertisements that use English construct the 'implied reader' as one who is future-oriented. For instance, the advertisement in (9), an advertisement for a Chinese telecommunications corporation, constructs the 'narratee' as one that is prepared for the 新世纪 'new century' in which China will join the World Trade Organization (WTO).

- (9) 中国联通 CHINA UNICOM 迎接 WTO 新世纪
China Unicom CHINA UNICOM greet WTO new century

新联通 新网络 新服务
new Unicom new internet new service

'China Unicom welcomes the joining of WTO. In the new century, new China Unicom will provide new Internet and new services.' (《人民画报》, 2002:1)

The advertisement in (10), an advertisement for a correspondence school, also uses English to construct the 'implied reader' as one who is future-oriented.

- (10) 读 朝日函授 考 日语 «托福» 走 成功
read Zhaori Correspondence take test Japanese TOEFL walk success

- (10) 之路 北京 申奥 成功 加入
 AUX road Beijing apply for the Olympic Games succeed join
 WTO 在即 机会 无限 ... 你 准备 好了 吗?
 WTO instantly opportunity limitless you prepare well AUX QUESTION
 'Enroll in *Zhaori* Correspondence School, take the Japanese TOEFL, and be successful. Beijing has succeeded in its application to host the Olympic Games. China is soon to join the WTO. Many opportunities are waiting for you. Are you ready?' (《中国青年》, 2002:1)

The use of English in Chinese advertisements is, too, connected with the construction of a modern identity for the 'implied reader'. For instance, in (11), an advertisement for a private institute teaching people to be confident, the English word *case* is mixed with Chinese expressions. Since in China the expression *case* is most often used by those who work in relatively recently emerging businesses, such as international trade or law firm, the use of this word implicitly depicts the 'narratee' as modern.

- (11) 学 case 拿 积分 冲 大奖...
 learn case take credit prepare big prize
 '(you can) learn how to analyze cases, accumulate credits, and prepare for the big reward.' (<http://www.163.net>, December 24, 2001)

The advertisement in (12) is another example of similar type. Currently in China only those who are considered modern use wireless services. In this sample English is used in both the product's name and its slogan.

- (12) 诺基亚 NOKIA connecting people
 Nokia NOKIA connecting people
 'Nokia, connecting people.' (《中国青年》, 2001:21)

4. DISCUSSION AND CONCLUSION. This paper argues that in the use of English either to directly express or in connection with a certain type of message, a social identity is constructed that is consistent with the content of that message. The claim that a certain advertisement featuring the use of English constructs a certain social identity is not intended to mean that only one identity is constructed in each advertisement. The truth is usually the opposite. For instance, in (10), which is repeated here as (13) for convenience, not only a future-oriented, but also a success-oriented social identity is constructed, as is shown by the expression 走成功之路 'take the road of success'. This is all very natural, since one person may assume multiple social identities, even in the same context.

- (13) 读朝日函授 考日语 «托福» 走成功之路 北京申奥成功, 加入 WTO 在即, 机会无限... 你准备好了吗?
 'Enroll in Zhaori Correspondence School, take the Japanese TOEFL, and succeed. Beijing has succeeded in its application to host the Olympic Games. And China is soon to join the WTO. Many opportunities are waiting for you. Are you ready?' («中国青年», 2002:1)

By investigating the use of English, mostly in the form of Chinese-English codeswitching, as a means of identity construction, this study sheds light not only on the interaction between language use and identity construction, but also on the socio-psychological motivation of codeswitching, in other words, the function of codeswitching. Perhaps more significantly, this study contributes to the research on bilinguals' linguistic creativity (e.g. Kachru 1986a, 1986b), specifically the creativity of Chinese-English bilinguals (e.g. Zhang 2002). In this case, copywriters expert in both Chinese and English capitalize on the special status of English in China and employ Chinese-English codeswitching as a discursive strategy (Gumperz 1982b) to serve the purpose of persuasion.

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- ¹ I am grateful to the two anonymous reviewers for their critique. Thanks also go to those who offered their comments and suggestions at the 29th LACUS Forum at the University of Toledo.
- ² In this study, it is not claimed that the targeted audiences necessarily have knowledge about English. As a matter of fact, in most Chinese advertisements, the use of English is not intended primarily for communicating information about advertised products, but for other pragmatic purposes, for example, to strike potential buyers with the impression that the products are of good and of dependable quality, which is usually automatically associated with the use of English. This helps to explain why in most advertisements only Chinese-English code-mixing, instead of a text completely in English, is used.
- ³ Gass and Seiter (1999) contains a thorough discussion of the definition of persuasion. For instance, they distinguish between pure versus borderline cases of persuasion. They also present five basic criteria for defining persuasion, viz., intentionality, effect, degree of free choice, symbolic action, and interpersonal versus intra-personal.
- ⁴ As is suggested by the definitions here, not all advertisements primarily aim to sell a product. Instead, an advertisement can be launched to serve a variety of other purposes. For example, an advertisement may have the goal of pleading, warning, amusing, informing, misleading, moving, teaching, or seeking support (e.g., Cook 1992, Covino 1998).
- ⁵ The argument that the linguistic design of an advertisement inevitably takes the 'pathos' of the 'narratee' into consideration is also grounded on the theory that language use is always a reflection of multiple voices and that both speakers and hears are present in a discourse (e.g., Clark & Holquist 1984).
- ⁶ Italics are used in word-for-word glosses to indicate use of English or Roman script words within Chinese text.

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THE PLACE OF WRITING IN THE GLOSSEMATIC/ STRATIFICATIONAL MODEL

EARL M. HERRICK

Texas A&M University-Kingsville

MOST LINGUISTS, when they have constructed their theories of language, have observed that more languages are spoken than are written and also that people generally learn to speak languages before learning to write them. Linguists have therefore generally constructed theories of language which assume that speaking is the one natural communication channel for languages. The resulting linguistic theories and models often have this assumption of the priority of speaking built into them so deeply that it is very hard to incorporate into them any other communication channel, such as writing.

1. THE ABSTRACTNESS OF GLOSSEMATIC/STRATIFICATIONAL THEORY. The glossematic/stratificational theory of language, however, does not assume the priority of speaking, simply because it is so highly abstract that it does not assume that language has *any* one specific communication channel. The glossematic/stratificational model of language can therefore be used equally well for describing speaking, writing, and every other means of linguistic communication.

Glossematic and stratificational linguists all accept that writing is a genuine part of language, but some of them pay more attention to it than others do. Although Hjelmslev and Lamb both say that speaking and writing are equally valid as communication channels of language, they only describe spoken language in detail. On the other hand, within the older, glossematic stage of this theory, there is a highly important paper by Uldall (1944) in which he specifically describes how writing is a valid communication channel of language.

Within the more recent, stratificational stage of this theory, Gleason has always been open to the idea that writing is a genuine part of language. In his neo-Bloomfieldian textbooks of four decades ago (Gleason 1955; Gleason 1961) he did not exclude it from linguistics, as many other linguists of his time did, and in *Linguistics and English Grammar* (Gleason 1966) he treated the difference between speaking and writing as one of the many kinds of differences that exist within language. When he started to help develop stratificational theory, he assumed that writing should be included in that theory's model of language. And he let a student write a thesis (Herrick 1966) on how to analyze the Roman/Latin¹ alphabet, using a theoretical outline that was essentially like the one then in use for analyzing all the other strata of language. Other stratificationalists have also taken considerable interest in writing. Lockwood has studied the relationship between writing and speaking (see, for example, Lockwood 2001), and he has prepared instructional materials on the linguistic study of writing systems. Herrick has studied how written characters can be analyzed in terms

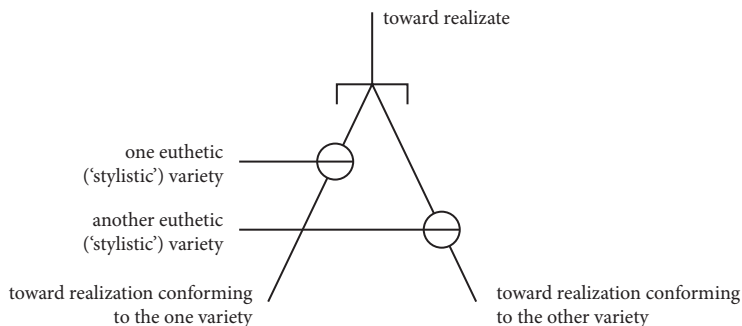


Figure 1. *A euthetic disjunction cluster.*

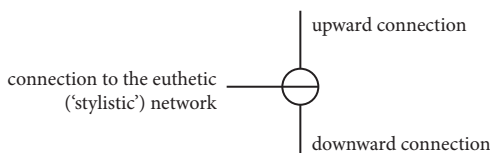


Figure 2. *A GATE node.*

of stratificational theory, and he has often drawn on his study of writing systems for evidence in discussing stratificational theory in general.

2. THE EUTHETIC NETWORK AND EUTHETIC DISJUNCTIONS. Stratificational grammars are usually modeled by logical networks of lines and nodes (along with some labels attached here and there for convenience). In such a model of a language that is both spoken and written, there must be a single upper part for describing the semology (if there were not, the model would not represent one language); there must be separate lower parts for describing the phonology and the graphonomy; and there must be places in the network where a person producing an utterance in the language can choose whether to speak it or write it.

There is a stratificational notation (which is fully described in Herrick 1984) that can describe how choices like these are made. This notation assumes that, in addition to the realization and tactic portions of the linguistic network, there is an additional portion which has its own interface with the real world and which controls and detects linguistic varieties such as social dialects, levels of respect, and many other things, some of which have been called linguistic 'styles'. This additional portion of the linguistic network might be called the 'stylistic' portion, but because the word 'style' has so many different meanings, I would prefer to find a distinctive name for it. I have therefore called this additional portion of the linguistic network the 'euthetic' portion, basing that term on a Greek stem which means 'well chosen' or 'appropriate'. The linguistic varieties which it handles can be called euthetic varieties. The places where choices between euthetic varieties of language are made can be called euthetic disjunction clusters, and they are constructed in the way shown in Figure 1².

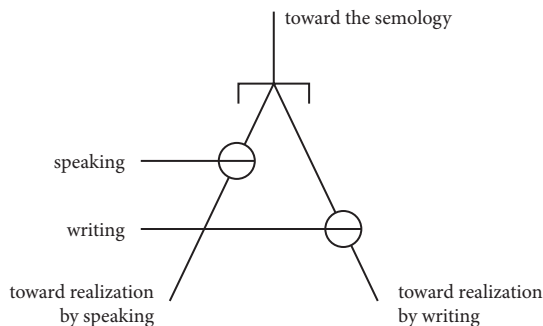


Figure 3. *A speech/writing disjunction cluster.*

A euthetic disjunction cluster uses a special kind of node, which is called a *GATE* node and is illustrated in Figure 2. During downward transduction, a *GATE* node acts essentially like an *AND* node; during upward transduction, it helps to detect the consistency of transductions through it. Each *GATE* node has an upward connection toward the semology, a downward connection toward the communication channels, and a sideways connection toward the euthetic portion of the linguistic network.

3. SPEECH/WRITING DISJUNCTIONS AS EUTHETIC DISJUNCTIONS. The choice between speaking an utterance and writing it is a euthetic choice. The places where the transduction of an utterance diverges toward the phonology or toward the graphonomy are therefore euthetic disjunctions. And the parts of the network which model these euthetic disjunctions can be called 'speech/writing disjunction clusters'.

In Figure 3, if a downward transduction through the cluster is to be spoken, the line labeled 'speaking' will be activated, the *GATE* node connected to that line will be opened, and the transduction will run down toward the phonology. But if a downward transduction through it is to be written, the line labeled 'writing' will be activated, the *GATE* node connected to it will be opened, and the transduction will run down toward the graphonomy.

Euthetic disjunctions can be used not only for describing the places where a transduction finally diverges toward a spoken or a written embodiment, but also for describing the other linguistic alternatives which are appropriate to written utterances rather than to spoken utterances, and vice versa. These differences between written and spoken language have been extensively investigated by Vachek and other linguists of the Prague school. They have developed an entire theory of how a language can have two valid norms—a written norm and a spoken norm—which are different because they perform different tasks for the linguistic community that uses them. (See, for example, Vachek 1973; Vachek 1989.)

The Praguean differences between the written and spoken norms of a language can readily be modeled by using a euthetic network and euthetic disjunctions. In such a network, the utterer will make a single decision to produce either a written utterance

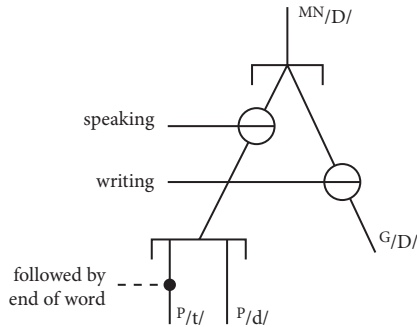


Figure 4. *Morphophonemic realization in German.*

or a spoken one, and the network will then operate to control the euthetic disjunction clusters inside the realization and tactic portions of the linguistic model which will choose all the kinds of organization, syntax, and word-choice that are appropriate either to written communication or to spoken communication. Finally, the transduction will run through speech/writing disjunction clusters, so that it will be embodied, appropriately, either in written, visible marks or in spoken, audible sounds.

The exact places where the speech/writing disjunction clusters are located within a linguistic model will have to be found out for each language by analyzing it. Sometimes, the answer may be simple. Finnish is reputed to have completely regular correspondences between its phonemes and its graphemes. If so, all transductions in Finnish can run downward to its morphonic level, and all of its speech/writing disjunction clusters can be located immediately below those morphons. German is well known for having what are called 'morphophonemic spellings'³ in which, e.g., $G/D/$ corresponds to either $P/d/$ or $P/t/$, depending on whether the phoneme occurs at the end of a word. For German, the choice of phoneme is therefore made as is shown in figure 4. However, the opposite situation can also occur. Spanish has what can be called 'morphographemic spellings' in which, e.g., $P/\theta/$ corresponds to either $G/C/$ or $G/Z/$, depending on the following grapheme. For Spanish, the choice of grapheme is therefore made as is shown in Figure 5. The English language has so many different kinds of relationships between the spoken and written forms of its words that it will be a very complicated but very instructive task to find out just where all of its speech/writing disjunction clusters should be located.

4. THE POSSIBILITY OF COMBINING EUTHETIC DISJUNCTION CLUSTERS. As it runs through the entire linguistic network of a language, a transduction may very possibly run successively through several euthetic disjunction clusters at which different choices are made. Figure 6 has an example of this from Serbo-Croatian. Ever since the Vienna Literary Agreement of 1850, Serbo-Croatian has been assumed to be one language with one orthography written by two alternative sets of characters (Wilson 1970:312-3). A Serbo-Croatian downward transduction therefore enters this network fragment along the line

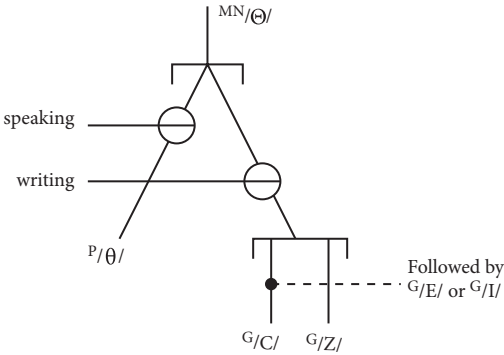


Figure 5. Morphographic realization in Spanish.

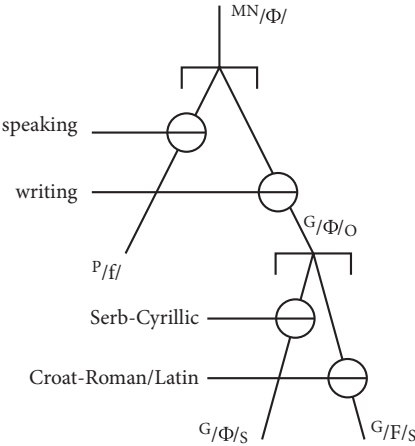


Figure 6. Realization of a Serbo-Croatian orthography-grapheme.

that has a morphon label⁴. If the utterance is to be written, the transduction runs downward through the GATE node connected to the line labeled 'writing', and from there runs downward along the line having a grapheme label with following subscript O, which represents an abstract grapheme of the orthography. Then, the transduction runs downward to another euthetic disjunction cluster. If the person producing the utterance is writing as a Serb, the line labeled 'Serb-Cyrillic' will be activated, the attached GATE node will be opened, and eventually a grapheme of the Cyrillic script will be written. But if the producer of the utterance is writing as a Croat, the line labeled 'Croat-Roman/Latin' will be activated, the attached GATE node will be opened, and eventually a grapheme of the Roman/Latin script will be written. The two lowest labels in Figure 6 have subscript S, showing that they represent graphemes of specific scripts.

5. EXAMPLES OF REAL transliterations. When graphemes of a language are realized by visible characters which are not the ones usually used for writing that language,

Schultz	German
Shultz	English
Szolc	Polish
Sulc	Hungarian

Figure 7. Transliteration with the same script, according to spelling conventions of four languages.

Београд	Beograd
Beograd	Beograd

Figure 8. Transliteration with scripts that share their suprasegmentals.

the result can be called a ‘real transliteration’. The languages and orthographies which write down such transliterations may have their own tactics and other properties that may have visible effects on the resulting transliterations.

Figure 7 shows a kind of real transliteration that arises because different languages have different speech/writing correspondences. It is a family name that is always pronounced in essentially the same way, but which must be spelled differently when it is written as part of four different languages, because the phonemes and graphemes of those languages correspond in different ways.

Figure 8 shows a kind of real transliteration that is institutionalized within the Serbo-Croatian language (which, as mentioned above, is assumed to be one language with one orthography expressed by two sets of characters). This example shows the name of a Serbian city, written in both the Cyrillic script and the Roman/Latin script. The locations of the euphonic disjunctions needed for realizing this name will be complicated, because some of these Cyrillic and Roman/Latin characters can be similar to one another for three different reasons: 1) because both scripts are derived from the same early Hellenic writing system and some basic shapes of their characters have not changed in nearly three thousand years; 2) because Tsar Peter the Great changed the Russian writing system so that it would look more like the writing systems used in Western Europe; 3) because these scripts—which both have capital and lower-case characters and also have upright and sloped characters—belong, along with some other scripts of Christian Europe, to a graphic Sprachbund in which all the scripts have these alternative forms.

Figure 9 has an example of a transliteration in which two scripts do not have the same suprasegmental graphemes: the name of India’s international airline as it is written on its airplanes. It is written in English in the Roman/Latin script and is pronounced ‘Air India,’ and it is also written in the Devanagari script by using characters which are also pronounced ‘Air India.’ The airline’s name is therefore written on the airplanes twice in English, once in Roman/Latin letters and once in Devanagari letters. However, these Roman/Latin letters are capitalized, and therefore they realize

एअर-इंडिया
AIR-INDIA

Figure 9. Transliteration with scripts that do not share their suprasegmentals.

'h v h אהבה

Figure 10. Transliteration with scripts that do not write the same categories of phonemes⁵.

— — — — — — — — — —
T O L E D O

Figure 11. Quasi-transliteration into International Morse Code.

a suprasegmental grapheme of capitalization, whereas the Devanagari letters are neither capitalized nor non-capitalized, because the idea of capitalization does not apply to the Devanagari script.

Figure 10 has a transliteration involving two scripts that do not represent the same classes of phonemes. The Square-Hebrew script has graphemes corresponding to the consonant phonemes of Hebrew, but it has no graphemes regularly corresponding to its vowel phonemes. A Roman/Latin transliteration of the Square-Hebrew script therefore produces something that looks unpronounceable to people who know only the Roman/Latin script, because (having no vowel characters to be read) it does not conform to the tactics that are expected for things written in Roman/Latin characters. (And, of course, the Square-Hebrew letters are read from right to left, while their Roman/Latin transliteration is read from left to right.)

6. EXAMPLES OF QUASI-TRANSLITERATIONS. Hjemsløv (1970:40) says that 'the elements in a linguistic structure may be represented in any way whatsoever, provided only that the elements required by the structure are kept distinct', and he follows this statement by giving examples of a great variety of unusual substances which can serve to embody the linguistic forms of utterances. Embodiments of graphemes by modalities that are not normally used by written languages can be called 'quasi-transliterations', and the modalities used for them may have their own tactics and other properties which can affect the resulting quasi-transliterations.

Figure 11 has an example of a word in Morse Code. This figure uses a conventional way of showing this code, which shows how the inventor originally expected its messages to be read, and which is what gave the *telegraph* or 'far writer' its name. The original receiving instrument had an inked pen rising from and descending onto moving paper; however, telegraph operators soon discovered they could understand messages more easily by listening to the lever of the receiving instrument click up and down, so they did not put paper into it and just listened to the lever clicking. Since then, Morse Code has been embodied by many different modalities. It has been sent by radio

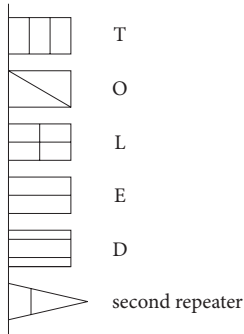


Figure 12. *Quasi-transliteration into the International Code of Signals.*

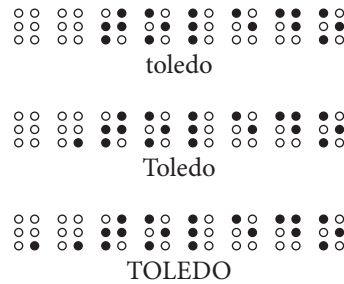


Figure 13. *Quasi-transliteration into Standard English Braille.*

waves and buzzers to be heard, and by flashing lights and wigwag flags to be seen, and by audible raps in which the time between momentary sounds represents the lengths of the original dots and dashes. But in terms of its linguistic form, it remains the same code. There is, however, a tactic difference between this quasi-transliteration and normal written English. Morse Code transmits only segmental graphemes, and the idea of capitalization does not apply to it. The first letter of the message in figure 11 is therefore simply a letter *T*; it is neither capitalized nor non-capitalized.

Figure 12 represents in black and white the colored flags that make up messages in the International Code of Signals⁶. This quasi-transliteration has two tactic differences from English orthography. These flags do not show capitalization, and so, like Morse Code, these flags indicate letters that are neither capitalized nor non-capitalized. Also, each grapheme is represented here by one kind of flag, except that the two occurrences of *O* are represented by different flags. This results from the tactics of this code. A ship carries only one flag for each letter. Therefore, in order to construct a hoist of flags spelling out this name, five different flags are used for representing five different letters, and the last flag, which is called Second Repeater, repeats the second flag in order to show the last *O* of the name.

Figures 11 and 12 both fail to embody some suprasegmental graphemes of English orthography. Figure 13 shows a quasi-transliteration which embodies suprasegmental graphemes of English by its own segmental characters. It has three examples of the Braille code, which is read by using the sense of touch. A Braille character is constructed within a rectangular cell where six raised places can occur. (The black dots represent raised places; the circles represent places that might have been raised but are not.) The first embodiment in Figure 13 consists of six cells that embody six letters, and it corresponds to what would be a common adjective written entirely in lower-case characters. The second embodiment has cells embodying the same six letters, preceded by a cell which shows that the word has an initial capital letter. The third embodiment has cells embodying the same six letters, preceded by two cells which show that the entire word is capitalized. In these examples, therefore, suprasegmental graphemes of English are embodied by segmentals of Braille.

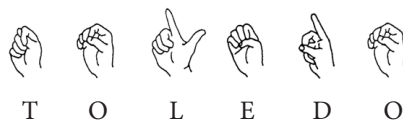


Figure 14. *Quasi-transliteration into American Fingerspelling.*

Among the kinds of communication which use visible gestures as their modality, fingerspelling, which is illustrated in Figure 14, is also a kind of quasi-transliteration, because it represents individual graphemes by a modality other than writing.

There are many other kinds of quasi-transliterations, including the punched holes in teletype tapes, the ASCII and Unicode sequences of binary digits used for sending messages between computers, and the semaphore code with its two flags held in eight possible positions. But in terms of the glossematic/stratificational model, all of these quasi-transliterations are simply alternative ways of embodying strings of graphemes that realize utterances of some languages, and all of them can be modeled by euthetic disjunction clusters that are located immediately below the speech/writing disjunction clusters of those languages and which lead somehow to their embodiments in the unusual modalities.

The spoken names of letters also need to be mentioned here, because in some sense they involve yet another kind of transliteration. However, their correct analysis will be complicated. A downward transduction which includes spoken letter names must first run downward through the graphotactics, so that the graphemes will receive whatever effects are appropriate; it must then run upward into the morphology, where the graphemes will be realized by morphemic signs representing their names; and it must then run downward through the phonotactics and eventually to the phonetic substance.

7. CONCLUSION. The title of this paper asks what the proper place of writing should be in a glossematic/stratificational model of language. Once the power of the euthetic network and the euthetic disjunction clusters is understood, however, the answer to that question becomes simple. If a language is both spoken and written, its linguistic model will have a graphonomy; its graphonomy will be attached to the rest of the linguistic network by speech/writing disjunction clusters, which are a special case of euthetic disjunction clusters; and the exact places where those clusters are located must be found by making a linguistic analysis of the language.

¹ As applied to language, the terms 'roman' and 'latin' have been used with many different meanings, but the designating of the letters of this script seems to be the only purpose for which both terms have been used. This combining of the terms for naming this script should therefore be unambiguous (see Herrick 1999).

² I want to thank Michael Cummings for helping to clarify my thinking by asking me whether I would want to use the term 'register' rather than the term 'euthetic' for describing these linguistic varieties. However, I think of the term 'euthetic' as the name of a

certain kind of logical network, consisting of certain kinds of nodes and certain patterns of connections among them, and I think of the euthetic varieties of language as whatever linguistic varieties can be modeled by the euthetic logical network. I would prefer to use the term 'euthetic' as the name for that kind of logical network, not as a term for kinds of linguistic phenomena (although informally something may be called a euthetic phenomenon if it can be modeled by a euthetic network). We may eventually find that most linguistic varieties which have been called registers can be modeled by euthetic networks, but it is possible that some things which can be modeled by euthetic networks have not been called registers, and it is possible that some things which have been called registers cannot be modeled by euthetic networks.

- ³ According to some phonological theories, they would be called 'archiphonemic' spellings.
- ⁴ The symbol with subscript O contains a Cyrillic character only for convenience. At the point where it occurs, the transduction is so abstract that it is neither Cyrillic nor Roman/Latin.
- ⁵ I want to thank Saul Levin for suggesting to me that I could have transliterated these Square-Hebrew letters in another way. This helps to remind us that several ways of transliterating one script by another may be in use at the same time.
- ⁶ This example is not a normal use of these flags, because a hoist of them normally contains no more than four flags, and because, without the use of certain special flags, they are not used for spelling out words in plain text. However, this example helps to illustrate how quasi-transliterations can impose their own tactics on utterances.

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LINGUISTIC TRAITS OF THE NEW GUINEA PIDGIN, TOK PISIN, FROM THE PERSPECTIVE OF ERROR-CONTROL CODING

JOHN T. HOGAN
University of Alberta

IN THE PRESENT PAPER, several features of Tok Pisin, a lingua franca spoken by forty to fifty percent of the inhabitants of New Guinea, will be discussed in terms of the basic properties of error-control codes. Tok Pisin serves as a second language used among persons from over seven hundred language groups in Papua New Guinea. This diversity of linguistic backgrounds creates an intersection of linguistic and cognitive expectancies that do not totally overlap but have areas—that is, complementary sets—that are not shared by speaker and hearer. In an information theory sense, this is tantamount to a system that has a high degree of noise in it. Noise is anything that will degrade the production or reception of a speech signal so that a message cannot be successfully decoded.

A sketch of error-control coding will be presented first below in order to highlight its relevance to language as a communication system. Second, several of its facets will be discussed in terms of the development of the New Guinea Pidgin, Tok Pisin.

1. ERROR-CONTROL CODING

1.1. MOTIVATION. The primary motivation for error-control coding is to construct ways to protect signals against degradation by noise. The simplest way of doing this is to repeat a message several times. This causes the signal which encodes the message to be longer than the absolute minimum. Thus message redundancy and length are increased as noise-decreasing methods such as simple repetition are introduced. This is one of the fundamental trade-off relations in information and coding theory. There is a cost to the use of noise resistant devices in that, as redundancy increases with the addition of the same information to the signal, the signal will become longer and therefore will produce a greater burden on the short-term memory needed in the decoding of the signal. The task of error-control coding is to minimize both the loss of information due to noise and the loss of information due to the finite capacity of short-term memory—the psychological analogue of signal fading due to the loss of energy over time.

1.2. NOISE TYPES. In the simple model of communication there is a sender, receiver and channel. Its parallel in human communication is the speaker, hearer, and a physical and physiological channel. Noise types can be associated with each component in the model. (1) Noise due to the speaker may occur at the production level, as in stuttering or dysarthria, or at higher levels of planning. For example, Fromkin (1973) lists errors of anticipation such as *a leading list for a reading list*, errors of perservation

such as *a phonological fool for a phonological rule*, deletion errors such as *peach error for speech error*, or errors of exchange such as *bop a dromb for drop a bomb*. It should be noted that if no context is present, some errors cannot be detected, since the error results in another actual phrase of English. On the other hand, an error resulting in a nonsense phrase affords some error detection. (2) Noise in the hearer can be physiological, as in hearing loss; neurological, as in a loss of attention due to poor nutrition; etc. Noise can also occur when two signals are overloading our attention, as in cross-talk on a telephone line, or print-through on a thin piece of paper. (3) Noise in the physical channel is what one usually understands as noise. This type interferes with the signal, as in the case of masking of an audio signal or snow in a television signal.

The consequence of noise either renders the signal undecodable by the hearer, produces ambiguity when information is lost, or causes misinterpretation of the message. Beckmann (1972) discusses several exceptions to the definition of noise where information is lost but not because of noise. (1) The credibility of the speaker is important. A credible speaker is either consistently a truth-teller or a liar. In the latter case, negation of the liar's statements may still yield valuable information to the hearer. The credibility of a message is also somewhat dependent on the probability of an event, independent of speaker. For example, if a non-credible speaker says that 'snow is white', we may believe this despite the speaker. A non-credible speaker then is one whose statements are independent of the states of affairs. (2) Structural or lexical ambiguity can result in postponing a decision until further information is received. For example, the sentence *After it rained, the painter put on another coat* cannot be entirely decoded until the hearer has more information from the context as to whether *coat* means a 'jacket' or a 'coat of paint'. Similarly, the sentence *Jane Marple read her mystery stories* is ambiguous until the grammatical status of *her* is known, that is, whether it is a possessive or indirect object personal pronoun. Locally ambiguous sentences such as *The logs floated down the river sank* can be reparsed after *sank* is heard as the main verb, giving *The logs that were floated down the river sank*. (3) The transmission rate of information may be too high or too low. A too-high transmission rate is either too fast or the information density (semantic density) is too high, causing overload in the hearer. This may occur when a student takes a higher level course without the prerequisite courses. If the information rate is too slow, boredom may be induced. If the rate is extremely slow the hearer may even forget a previous word after a succeeding word is received. (4) Finally, if the hearer lacks interest in the message, information is discarded or if the hearer does not have sufficient knowledge of the culture, society, areas of knowledge of the speaker, then faulty communication is likely. For inhabitants of New Guinea with its more than seven hundred languages, gaps in knowledge of another's code can be a great source in information loss.

1.3. TRANSMISSION RATE. So far, the concept of noise has been discussed; its corrective counterpart, redundancy, now follows. Redundancy, which repeats all or part of the information to be transmitted, has the effect of increasing the length of a signal without increasing the basic message content. In other words, redundancy lowers the

transmission rate measured as the information flow per unit of time. If the rate is very low, a burden on working memory may result, since longer sequences of linguistic units have to be stored for information that could have been encoded by shorter sequences. Zipf (1965) claims that this situation requires greater effort in processing, and there are many examples of speakers trying to optimize the coding effort by reducing the phonemic size of a lexical item that has a high frequency of use. Acronyms like *NATO*, abbreviations like *the U.S.*, clippings like *fridge*, *lab*, or *prof* save the speaker from uttering extra syllables and ease the storage requirements of the hearer.

The size of a phonological inventory is one linguistic factor that can play an important role in transmission rates of information. With more phonological segments available, a greater number of monosyllabic sequences is possible for the lexical system of a language, assuming only the use of CV or CVC combinations. With the inclusion of possibilities for consonant clusters, the lexicon can possess even a greater number of monosyllabic sequences. The addition of tone increases the number of distinctive units without adding to their length. With such devices as these, a lexicon can have a great number of monosyllabic units, as well as a vast number of two- and three-syllable words. A language that has fewer segments and/or restricted consonant cluster possibilities will exhaust the monosyllabic possibilities very quickly and polysyllabic words will be the norm. This latter situation slows down the transmission rate. On the positive side, a phonemic inventory with fewer units will have more noise resistance, since minor articulatory errors and variations may not change the phonemic category in question.

If an upper limit to the length of words is assumed, then the total number of possible syllable sequences (real words and nonsense words) will determine the signal space of a lexicon. Interword distances are determined by a measure of phonetic similarity between each pair of items. Languages that exploit a larger number of possible syllable sequences of shorter length will have a higher transmission rate but again at a certain cost. If an error occurs in this case, the resultant lexical item will be a real word in the language rather than a nonsense word. For example, an error of *blue bloom* (for 'blue broom') results in another actual noun phrase and thus no error will be detected unless a larger context provides some clues.

A strategy where context plays a large role in the increase of information transmission occurs when homonymy is widely used. Several meanings can be associated with a monosyllabic form and therefore avoidance of polysyllabic sequences is accomplished to a certain extent. In English, homophones usually have unrelated meanings, belong to different lexical classes and differ in word frequency and this reduces the probability of error.

1.4. ERROR-CONTROL CODING IN THE LEXICON. A method for avoiding failure in error-detection is to code lexical items that have similar or related meanings, such as antonyms, synonyms and co-hyponyms, with very dissimilar phonological forms. Thus, in the case of semantic similarity, an error would not change a lexical item into one of similar meaning that could not be decoded correctly via context, but instead

would produce a nonsense word or an actual word that would not fit into the context in question. Conversely, lexical items of highly dissimilar semantic content can be very similar in phonological form (cf. Hogan 2002). In the case of homonyms, they are identical in form.

In general, ideal coding in the lexicon would assign a meaning to phonological sequence in signal space and leave neighbouring possibilities uncoded. That is to say, the lexical neighbours of an actual word would be nonsense words; thus any mispronunciation or error in transmission would change an actual lexical item into a nonsense item which would be detected as an error and most be likely corrected by the hearer assuming it was the nearest actual neighbour. This low exploitation of signal space provides good error protection but lowers the transmission rate of information. Under low exploitation of signal space, phonological speech errors such as anticipatory, perseverative and exchange errors would produce nonsense phrases. With high exploitation of signal space, these errors are more likely to produce actual forms and, in the short run, not be detectable as errors.

1.5. ERROR-CONTROL CODING IN MORPHOSYNTAX. In syntax, the arguments of a predicate as the grammatical relations of subject, object and indirect object are encoded by word order, case marking and agreement; often a combination of these three is used in varying degrees across languages. When word order and case marking are not in conformity, as in the example *Him see they*, an error is detected. Apart from marking major syntactic relations, affixes and function words also indicate the presence of major classes. Number, gender, definiteness, classifiers, etc., are checks on the occurrence of a nominal category. Similarly, tense, aspect, and mood chiefly indicate the occurrence of a verb. These elements convey a less specific type of information than lexical items, and are on a gradient of specificity and density of information ranging from very low, as in the case of number or tense, to moderately low for aspect and mood. To act as error correction devices, such elements must be obligatory categories in a language. Words and affixes can be used to check on any kind of information, but cross-language comparison indicates that the above types are the most prevalent.

2.0. TOK PISIN AND ERROR-CORRECTION

2.1. FEATURES OF TOK PISIN. Tok Pisin is a pidgin language. Its development was first attested in the early nineteenth century. Pidgins typically have no native speakers. This can be a great source of noise, since speakers from the seven hundred or so languages of New Guinea will import the characteristics of their own first languages to Tok Pisin. In particular, Mülhäuser (1985) notes that the phonology of Tok Pisin seems specifically designed to be resistant to the importation of the phonological characteristics of indigenous language. As will be seen, Tok Pisin also seems to be 'designed' with second language acquisition in view. The following sketch (see Mihalic 1969, Murphy 1973, and Sebba 1997) gives some flavour of the language.

2.2. MORPHOSYNTAX. The language has no definite or indefinite articles, no plural marking except by a free form *ol*, no possessive clitics. However the subject noun has the form *i* before a verb and the object noun is signaled by *-im* suffixed to the verb.

Tense, mood, aspect may be optionally signaled by independent words. There is no copula verb.

The major syntactic feature is that SVO word order is strictly maintained. Until recent times, Tok Pisin has not had complex sentences, i.e., no sentences with relative clauses, nominal complement clauses and adverbial subordinate clauses. It appears that Tok Pisin is in a stage of rapid evolution.

2.3. PHONOLOGY. Tok Pisin has a five vowel system, [i, e, a, o, u], the nine oral and nasal stops of English, few fricatives, mainly [s] and [h], and all English approximants [r, l, j, w]. Many clusters, especially those in final position, are reduced to a stop or vowels are inserted between the consonants to make a two-syllable word, e.g. 'box' becomes *bokis*. Since English is now the main lexifier language, borrowing from English may produce a number of homophonous words. For example 'sheep', 'ship', 'seep' would all be *sip* in Tok Pisin. To avoid homophony, reduplication is used. Thus 'sheep' is *sipsip* whereas 'ship' is *sip*, and *san* is 'sun' and *san san* is 'sand'.

2.4. LEXICON. Semantically, there is a preference for transparency in compounds. For example, *biknem* (big name) = 'fame', *hai wara* (high water) = 'flood', *gutnem* (good name) = 'reputation', *smol papa* (small papa) = 'uncle', *bikwin* (big wind) = 'hurricane', *raunwara* (round water) = 'lake', *bik paia* (big fire) = 'hell', *maus gras* (mouth grass) = 'moustache', *maus wara* (mouth water) = 'saliva', *ai wara* (eye water) = 'tears', *retsos* (red sauce) = 'ketchup'.

The features of the lexicon are the most striking in comparison to English. It has been reported that the Tok Pisin lexicon may contain a few thousand words, the majority of items being nouns, then verbs and adjectives, some adverbs, six prepositions and some discourse marking words. The preference is for shorter, two-syllable words. When the nature of borrowing from English is inspected in cases of synonymy, it is the core, high frequency word that is borrowed (Stubbs 2001).

The size of the lexicon is very small in comparison to the estimate of the English 'mental' lexicon, which may range from 80,000 to 120,000 lexical items across various speakers (Aitchison 1994:6). This much smaller lexicon allows Tok Pisin to be highly learnable as a second language. A negative effect is that expressibility may be curtailed. However, it has been noted that circumlocution was a strategy in earlier stages of Tok Pisin. A famous example from the folklore of the language was the word for 'piano', namely, *bikpela bokis, supos yu paitim, em i-krai* (big fella box, suppose you fight him, he cry). After a lexicon becomes stabilized this strategy tends to diminish.

3.0. ERROR CONTROL IN TOK PISIN.

3.1. A TRADING RELATION. Given the high learnability potential of Tok Pisin due to its morphosyntactic simplicity, the error-control features from this domain are

minimal—even fewer than English, which is not the most robust language in terms of these features. However, the paucity of lexical items gives great error-control capability, since the acoustic distances between items can be much greater than in English. The result of this is that, on average, texts that have the same information content as an English equivalent will be much longer. Does this have a short-term memory cost? Perhaps not, since the texts of Tok Pisin unpack highly integrated information to less semantically dense but longer messages. Following Bransford and Franks (1971), only the gist of each sentence would be kept in long-term semantic memory and, therefore, not burden short-term memory.

Three communicative features act in a trading relation, given a discourse or text which signals a fixed amount of information: (1) the rate of information expressed as the number of linguistic units per time, (2) the information or semantic density per linguistic unit, and (3) the amount of time itself can all be adjusted for various communicative intentions. In the case of Tok Pisin, the information rate may be similar to that of English, and if the content of a discourse is controlled by a selection of equivalent texts, we must see a trade-off between information (semantic) density and time. That is to say, if linguistic units signal more information per unit in one language than those in another, signals in the former will take less time to transmit than those in the latter. Thus signals in the former language (e.g., English) carry more information per unit than those in the latter (e.g., Tok Pisin). The result is that the Tok Pisin signal will be longer than the English signal.

3.2. A COMPARISON OF TWO TEXTS. To demonstrate this, two texts were chosen for comparison in which the cultural content would be roughly equivalent (and different from modern technological literature). The most readily available texts are from the Bible. One of the Christian scriptures, Luke 1:5 to 1:13 was selected. The versions compared are from *The New American Bible* (1970) and *New Testament and Psalms in Tok Pisin* (1989). The criteria for counting words were guided by the conventions in the presentation of the text, namely, the spacing conventions, and by the entries in the lexicon. If the Tok Pisin entry consisted of two words associated with one meaning, then it was counted as one word. By and large, this occurred in proper names, such as *Nu Gini* 'New Guinea' and reduplicated words such as *kain kain* 'various'. Generally, the individual words in the lexicon corresponded to words separated by spaces in the texts. (See Appendix for both texts.)

The prediction from error-control coding is that the Tok Pisin text will be significantly longer than the English. A word count confirms this, showing that the Tok Pisin text is 214 words long and the English is 164 words. A χ^2 test indicated that these counts differ significantly at the $p=0.02$ level. In a closer examination of the text, part of the difference can be seen to arise from the lack of specific lexical items in Tok Pisin: for example, in line 26 of the Appendix we see 'incense' translated by *ofa bilong smok i gat gutpela smel* (offer of smoke which has a good smell), and in line 8, 'blamelessly' is *i no gat asua long ai bilong en* (he no got blame along eye belong him [= God]). Even more significantly, the phrase 'priestly usage', containing the abstract

Matthew 7	Greek (515)	English (567)	Dutch (607)	French (609)	Tok Pisin (1034)
Mark 2	Greek (543)	Dutch (647)	English (673)	French (710)	Tok Pisin (1072)
Acts 3	Greek (508)	English (580)	French (599)	Dutch (618)	Tok Pisin (947)
I Corinthians 2	Greek (286)	French (335)	Dutch (368)	English (379)	Tok Pisin (655)

Table 1. Word lengths of sample texts, ranked from shortest to longest.

noun ‘usage’, had to be informationally unpacked at length so that the actions pertaining to priestly usage were made explicit, as seen in lines 16–17. Mühlhäusler (1979) notes the difficulty of expressing abstract concepts by the use of circumlocution. He also states that some dictionaries list circumlocutions, but that such circumlocutions are susceptible to lexical replacement due to the instability of circumlocution. The time of their replacement could be a function of increased frequency of use and the ensuing lexical conventionalization.

Thus, comparison shows that the error-correcting benefit of having a lexicon with fewer words, so that interword distances in phonetic space are not closely packed, is offset by having some lexical items such as ‘incense’ being informationally unpacked in a quasi-definitional way. The opposite effect may be experienced when one reads an abstract of a scientific article in a journal such as *Nature*. Here the semantic density of the lexical items is so great that most of the abstract is unintelligible except to those in the field of research. For the educated outsider, the abstract may have to be greatly expanded, i.e., unpacked, to the extent that the information might be a chapter in a text.

The informational trade-off is that the transparency of the text has a cost in terms of the amount of time taken for the information to be received. As a conjecture, the psycholinguistic cost could be the increased burden on memory and attention.

3.3. WORD COUNTS FOR FOUR TEXTS IN FIVE LANGUAGES. As a check of the consistency of the observation noted in 4.2 above, four texts of the New Testament by different authors were also counted. The texts were taken from the original Greek and translations from it into English, Dutch, French, and Tok Pisin. The four texts are: Chapter 7 from Matthew, Chapter 2 from Mark, Chapter 3 from Acts, and Chapter 2 from First Corinthians. In the data shown in Table 1 for each text, the languages are ordered by the number of words used for the text, from lowest to highest.

From the counts in Table 1, we see that the highly inflected Greek has the shortest texts. Dutch, French, and English—closely related genetically, areally, and historically—have texts that are very similar to each other in word count. In all cases, Tok Pisin is still almost 300 words longer than the longest of the other texts.

4. CONCLUSION. As suggested earlier, there is indeed a trade-off between text length and lexicon size, as predicted by error-control coding theory. The smaller lexicon of Tok Pisin should ensure greater protection of the message signal against loss of information due to noise. The less 'crowded' lexicon offers the opportunity to space lexical items farther apart in signal space, and therefore in physical (acoustic) space, to protect against errors in the transmission of information. In addition, words of great length do not have to be innovated or derived when shorter signal possibilities are exhausted. This allows the transmission rate of information to remain fairly high.

The comparison of the texts in Tok Pisin and English shows a development that is not dissimilar to the process of education. At a certain educational stage, it may take more time to explicate ideas and theories, when the student's conceptual repertoire is just being built up. After a while, when more concepts are in place, the same information can be compactly represented, and can therefore be communicated more quickly. Again, this is always at a cost of increasing the confusability if items in perceptual space because of the increase of crowding in signal space.

This small study suggests that a typologically quantitative relation may be investigated between lexicon size and the statistics of text sizes. It would entail resources from the area of corpus linguistics in order to determine what kind of functional relation exists mathematically between lexicon size and the sizes of comparable texts. In this sense, the English and Tok Pisin cases discussed in this paper are just two highly separated points on a continuum of lexicon sizes.

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APPENDIX

- (1) *Taim Herot i stap king bilong Judia,*
Time Herod he stop king belong Judea,
In the days of King Herod of Judea,
- (2) *wanpela pris i stap, nem bilong en Sekaraia.*
one fellow priest he stop name belong him Zechariah
there was a priest named Zechariah
- (3) *Em i pris bilong ol lain bilong Abiya.*
him he priest belong all line belong Abijah
of the priestly class of Abijah.
- (4) *Meri bilong en em i bilong lain bilong Aron,*
woman belong him him he belong line belong Aaron
His wife was a descendant of Aaron
- (5) *na nem bilong meri em Elisabet. Tupela*
and name belong woman him Elizabeth. Two fellow
named Elizabeth. Both
- (6) *i stap stretpela long ai bilong God. Tupela*
he stop straight fellow along eye belong God. Two fellow
were just in the eyes of God.
- (7) *i save bihainim olgeta lo na olgeta tok*
he savvy behind him all together law and all together talk
following all the commandments and ordinances
- (8) *bilong Bikepela, na tupela i no gat asua long ai bilong en.*
belong Big Fellow and two fellow he no got blame along eye bilong him
of the Lord, blamelessly.
- (9) *Tasol tupela i no gat pikinini,*
That is all two-fellow he no got child
However they were childless
- (10) *long wanem Elisabet i no inap karim pikinini.*
along one name Elizabeth he no enough carry-him child
for Elizabeth was sterile.

- (11) *Na tupela i lapun pinis.*
and two-fellow he aged finish
Both were advanced in years.
- (12) *Wanpela taim ol lain bilong Sekaraia*
one-fellow time all line belong Zechariah
Once when it was the turn of Zechariah's class
- (13) *i go mekim wok pris, na Sekaraia tu i mekin*
he go make-him work priest and Zechariah too he make-him
and he was fulfilling
- (14) *wok pris long ai bilong God. Orait*
work priest along eye belong God. All right
his function as a priest before God,
- (15) *ol i pilai satu bilong painimaut wanem pris*
all he play dice belong find-him out one name priest
it fell to him by lot according to priestly
- (16) *i mas go insait long haus bilong Bikpela,*
he must go inside along house belong Big-fellow
usage
- (17) *bilong mekim ofa bilong smok i gat gutpela smel.*
belong make him offer belong smoke he got good-fellow smell.
- (18) *Na long dispela pasim ol i makim*
And along this fellow fashion all he mark-him
- (19) *Sekaraia na em i go insait bilong mekim ofa.*
Zechariah and him he go inside belong make-him offer
to enter the sanctuary of the Lord and offer incense.
- (20) *Long dispela taim*
Along this fellow time
While at the incense hour
- (21) *bilong mekim ofa, ol bikpela lain manmeri*
belong making-him offer all big fellow line man-woman
the full assembly
- (22) *i bung i stap ausait long haus bilong God*
he assemble he stop outside along house belong God
- (23) *na ol i beten i stap. Orait na wanpela ensel*
and all he pray he stop. All right and one-fellow angel
was praying outside, an angel
- (24) *bilong Bikpela i kamap long Sekaraia na*
belong Big-Fellow he come-up along Zechariah and
of the Lord appeared to him
- (25) *i sanap i stap long han sut bilong alta*
he stand-up he stop along hand shoot belong altar
standing at the right hand of the alter
- (26) *bilong ofa bilong smoke i gat gutpela smel.*
belong offer belong smoke he for good-Fellow smell
of incense.
- (27) *Sekaraia i lukim ensel na em i karap*
Zechariah he look him angel, and him he get-up
Zechariah was deeply disturbed upon
- (28) *nogut na i pret.*
no good and he afraid
seeing him and overcome by fear.

THE EFFECTS OF LITERACY ON LEXICALITY

AYA KATZ
Inverted-A, Inc.

LEXICAL STATUS in a language is considered to be synchronically fixed (Heine et al. 1991:95), but there is evidence from psycholinguistic experiments and observations that indicates there is more than one level of lexicality. In Chinese, the word for 'word' 字 *zi* simultaneously refers to a character, a syllable, a morpheme, a lexeme, and also to a syntactic word.

- (1) 我 們 走 路 去 學 校。
wo men zou lu chu sui xiao
1st PLUR walk road to study school
'We walk to school.'

Zi 字 'word' can refer to the ideograph 路 (character), to the sound *lù*, to the morpheme meaning 'road' or to the same morpheme serving as a less literal component in a compound such as 走路 *zou lu*, 'walk', and also to the compound itself. It does not matter whether a morpheme is free, such as 路 *lu* 'road' or bound, such as 們 *men* 'plural'. Each of these linguistic elements can be referred to as 字 *zi*.

In psychological terms, however, there are distinctions between the sorts of phenomena which are associated with the different levels. Literacy plays an interesting role in discovering these different layers of lexicality. When asked to repeat sentence (1) backwards, more literate subjects are more able to reverse the order of the morphemes as in (2)a, while less literate subjects can only reverse the order of the syntactic words, whether simplex or compound, as in (2)b.

- (2) a. 校 學 去 路 走 們 我
xiao sui chu lu zou men wo
b. 學 校 去 走 路 我 們
sui-xiao chu zou-lu wo-men

Less literate subjects are less likely to be able to give a meaning for the components of a compound than are more literate subjects. However, evidence from brain damaged patients suggests that there is a psychological reality to the lexical status of the component morphemes of a word. Those with Broca's aphasia often produce only the nominal element of a compound (e.g. the *fan* of *chi fan*) while those with Wernicke's aphasia are more likely to produce the verbal element of the compound (e.g. the *chi* of *chi fan*) (Bates & Chen 1991, Zhang ms). This implies that the grammatical

category of the component is still present synchronically and available to a speaker, despite the overriding category of the compound as a whole.

Slips of the tongue in normal, but less literate subjects indicate the primacy of the compound as a psychological lexeme. When asked to read sentence (3), a majority of undereducated subjects pronounced the sequence 小兔子 *xiao tu zhi* 'small rabbit' as 小白兔 *xiao bai tu* 'small white rabbit'. It seems that 小白兔 *xiao bai tu* has been lexicalized colloquially to stand for 'rabbit', and in reading 小兔子 *xiao tu zhi* rapidly the subjects accessed their semantic translation of the ideograph and then realized it in speech as their normal lexeme for the concept 'rabbit'. In that case, the compound 小白兔 *xiao bai tu* has become an opaque lexeme, whose component morphemes are irrelevant to the meaning of the whole.

- | | | |
|-----|---------------------------|-----------------------|
| (3) | 小 兔 子, | 跳 跳 跳 |
| | <i>Xiao tu zhi</i> | <i>tiao tiao tiao</i> |
| | small rabbit diminutive | jump jump jump |
| | 'The small rabbit jumps.' | |

If lexicalization is a language-wide phenomenon whose earmarks include componential opacity and morphological bonding, then one would not expect the degree of lexicalization of a word to be significantly affected by the literacy of the speaker. Yet following the standard view of lexicalization, that is precisely the conclusion that one would draw, given the above data.

2. LITERATURE REVIEW. Lexicalization, as a linguistic label, emerges from the functional linguistic school of thought, and it is often paired with the term grammaticalization (Heine et al. 1991, Hopper & Traugott 1993, Traugott & Heine 1991). As historical processes, both lexicalization and grammaticalization often result from reanalysis. However, while grammaticalization gives rise to new productive patterns that add to the grammar of a language, lexicalization produces seemingly isolated additions to the lexicon. Regularity, productivity, and transparency as components are therefore attributed to grammaticalized items, whereas idiosyncrasy, randomness and opacity are expected of lexicalized words.

2.1. LEXICALIZATION VERSUS GRAMMATICALIZATION. According to Heine et al. (1991: 95), the difference between the two terms can be summed up as follows: 'Assuming that both involve some kind of "idiomization", the latter may be said to be morphologically productive in the case of grammaticalization but not in that of lexicalization'.

The above is representative of statements about lexicalization in grammaticalization literature as a whole. Yet there are serious drawbacks to this approach when applied crosslinguistically to languages belonging to contrasting typologies (Katz 2001).

In a language such as Hebrew, there are almost no monomorphemic words, since vowels and consonants play complementary roles in word formation. The majority of vowels found in a Hebrew word code derivational and inflectional contrasts, while a

majority of consonants code lexico-semantic information. Morphemes are discontinuous, and every syllable carries parts of more than one morpheme. But despite the extremely fusional nature of the language, componential transparency is the norm, rather than the exception. In fact, in Modern Hebrew, non-linear derivation patterns, involving the use of discontinuous roots and templates to form new words are still extremely productive. (Bolzky 1999).

Mandarin is known as an isolating language, but it has a large stock of complex lexemes (Li & Thompson 1998). The dependence level of these lexemes is low, in that they are not phonologically affixed and there is no reduction or resyllabification involved. In this sense, the morphologically complex lexemes of Mandarin are quite different from those of Hebrew. But both Mandarin and Hebrew enjoy a high level of morphological transparency. As cited previously, there is evidence from brain-damaged speakers of Mandarin that components are accessed according to their grammatical categorization, rather than the grammatical category of the word as a whole (Bates & Chen 1991).

Multimorphemic words in English are more tightly fused than those in Mandarin, but less so than in Hebrew. Multisyllabic lexemes in English are common, but there is by no means a one-to-one correspondence between morpheme and syllable. Speakers of English have great difficulty analyzing lexemes into their component morphemes. Even in such common words as *heal* and *healthy*, speakers of the language require instruction in its history in order to identify the common root, according to the introduction to a leading textbook on the history of English (Pyles & Algeo 1993:2). In other words, commonly used English lexemes are often componentially opaque for the average speaker.

The implications for the concept of lexicalization from the above observations of Hebrew, Mandarin and English are as follows: (1) lexical status is not necessarily dependent on degree of fusion, (2) lexical status is not necessarily dependent on opacity or semantic bleaching of components, (3) opacity and fusion are independent of each other (Katz 2001).

The significance of these initial observations is as follows: if lexical status can be established independently of both fusion and opacity, then lexeme formation (i.e. lexicalization) cannot be defined as necessarily 'morphologically unproductive'.

Heine et al.'s statement (1991:95) might suggest that componential opacity is something that indicates a high level of lexicalization, where the term lexicalization is defined as incremental. The higher the opacity, the higher the degree of lexicalization. But if such an interpretation were used, most words in a language such as English might be judged to be more lexicalized than those in Hebrew and Mandarin. What would be the implications of such a finding?

One possibility would be to suppose that individual words in English have undergone a greater process of semantic erosion and that opacity results from such bleaching. But an alternative explanation is available: it is not so much that individual words have had their morphemes bleached, but rather that the speakers of the language, due

to a lack of overall systematicity in lexical patterning, have been conditioned to ignore componential analysis as a useful strategy.

2.2. LEXICALIZATION VERSUS DERIVATION. Since lexicalization as a linguistic concept emerges from the functional tradition of grammaticalization literature, the concept is often contrasted with grammaticalization. It is seldom directly compared to the traditional grammatical term 'derivation', and this omission can give rise to confusion. Are the terms *conterminus*? Does one include the other?

The traditional term 'derivation' has been relegated, at least in elementary linguistic texts, to extremely regular patterns of word formation, the most common examples being drawn from Latinate vocabulary items in English. Yet it is also used as a synonym for 'etymology'.

Hopper and Traugott (1993:49) state: 'The process whereby a non-lexical form such as *up* becomes a fully referential lexical item is called "lexicalization"'. The statement is indisputably correct on its face, but it carries some dangerous implications. It is implied, though not stated, that if a function word becomes a content word, then lexicalization has taken place, but not vice versa. In fact, some researchers confuse 'lexicalization' with 'degrammaticalization', implying a particular directionality to the process.

For our purposes here, we do not wish to second guess either the directionality of the process of word formation or its regularity or lack of the same. We are primarily concerned with how collections of morphemes are perceived by speakers to be single lexical units. For this reason, we introduce the more theoretically neutral 'lexicality'. Something is more lexicalized in this usage if it has a greater degree of lexicality, not necessarily because it has undergone a more extreme process of lexicalization.

Lexicality refers to the identification of a linguistic sequence as a single lexeme by speakers. Lexicality can be quantified. For example, we could argue that the English word *husband* has a higher level of lexicality than *housewife* which is more lexicalized than *house snake*. All are derived from a compound whose first element is 'house', but derivation is not equally obvious in each case. In this usage, lexicality is entirely synchronic and psychological.

3. EXPERIMENTAL METHODS AND RESULTS. This paper is based on data compiled under a project that set out to probe the issue of lexical transparency by comparing psychological componential opacity (the psychological ability of speakers to analyze components) with circumstantial componential opacity (whether the requisite cues to allow for such analysis are synchronically there) (Katz 2001)¹.

The Chinese portion of the experiment was divided into two parts. The first part involved a group of thirty children. The second involved thirty adults. Each subject was tested for level of literacy. Questionnaires were devised to test morphological recognition. Different questionnaires for the children and for the adults were chosen, each geared to suit the subjects' interests and attention spans. In order to minimize the direct effects of literacy, the subjects were not allowed to see the questionnaires or the written words. Instead, the tests were administered orally. (Katz et al. 2001)

Child	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Age	4	5	5	5	5	5	6	6	6	6	6	6	7	7	7	8	6	6	6	6	7	7	7	7	7	7	8	6	7	6
Level	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	3	3	4
Def.	3	2	2	3	1	3	3	3	2	3	0	2	3	3	5	1	3	2	2	6	0	4	3	4	1	0	4	0	3	3
Ex.	2	6	3	4	10	3	4	5	5	2	7	3	2	6	6	5	5	11	2	5	9	7	10	10	9	8	9	10	4	7

Table 1. Overall results for children.

3.1. THE CHILDREN. For the children, nonsense words from the Chinese translation of the Dr. Seuss book *A Wocket in my Pocket* were selected. The Chinese translation used ordinary Chinese morphemes to construct new words. The nonsense words provided a good opportunity for testing the child's recognition of the morphemes without a great deal of contextual cuing.

Each of the children was first introduced to a nonsense word on a page in the picture book in order to interest him. The children were shown the pictures only. The text was covered up. The child was asked to give a definition for each of the target component morphemes in the nonsense words. After that, the child was invited to provide some examples of words that had the target morpheme as a component. Children were tested from a list of fifteen words.

Table 1 below lists the overall results of the experiment involving children. Children are listed by identifying number rather than names². Literacy levels were determined according to the test described in Table 2 below. If a child failed to correctly define or give an example for a given test item, then that item was not counted in Table 1. The number of items correctly defined appear under the headings 'Def.' and of those for which a correct example was given under 'Ex.' The number of good definitions given by children ranged from zero to six. The number of good examples ranged from two to eleven.

The significance of the results will be discussed in more detail in the sections below. In general, however, it would appear that for many of the test subjects, a number of the nonsense words were semantically opaque as to the morphemes tested. Literate subjects did significantly better in providing examples than did their pre-literate peers. Exemplification is a more reliable measure than definition.

The pre-literate children gave an average of 4.6 correct examples. The literate children gave 7.6 correct examples on average. Because the lexemes in question were nonsense words, none of the children were likely to have had any experience with the test lexeme as a whole. The thing being tested for was familiarity with the parts of the word. All morphemes used were common and naturally occurring in ordinary vocabulary.

To illustrate how this process worked, in example (4) below, we offer the following exchange with child number 24 concerning test item number 9, TELLAR 紅心祖師: *red; heart; ancestor; teacher*. The English nonsense word TELLAR was translated into Chinese by 郝廣才 into a sequence of four morphemes, the last of which, 師 *teacher*, was being tested for in this exchange.

- (4) Q: 紅心祖師的師是什麼意思? *What's the meaning of 師 in 紅心祖師?*
 A: 撕開、獅子。 *To tear apart. A lion.*
 Q: 你有沒有聽過老師的師? *Have you heard of 師 in 老師?*
 A: 有啊! 我正要說, 只是... *Yes. I was about to say, but...*
 Q: 喔! 被我說了。 *I said it.*
 老師的師是什麼意思? *What's the meaning of 師 in 老師?*
 A: 是老師啊。 *A teacher.*
 Q: “師” 還可以造什麼詞? *Can you think of any words with the word 師 in them?*
 A: 獅子、施榮偉, *A lion. Shr, Rong-Wei; he is my friend.*
 施榮偉就是我的朋友。

The child thought of homonyms when asked to think of other words with the same component as 師. A more sophisticated speaker would have known it had to be 師, because he would have recognized the compound 祖師 *preceptor*. This might lead one to suppose that recognition of bi-morphemic subcomponents is what disambiguates possible homonyms. However, nineteen out of thirty children were able to recognize the 毛 *mao* ‘fur’ of 毛怪 *mao guai* ‘fur monster’ even though the word 毛 *mao* ‘fur’ has homonyms.

More literate subjects did significantly better at providing appropriate examples of other uses of the same morpheme than did their less literate counterparts. It seems that for the pre-literate, lexemes function holistically as phonological to lexical mappings, without the intermediate level of the morpheme. The experience of literacy in Chinese considerably boosts a speaker’s awareness of individual morphemes.

3.2. THE ADULTS. There were thirty adults who participated in the experiment. They were divided into two equal groups: literate and illiterate. The adult subjects were tested on thirty potential items and asked to define and identify specific subcomponents of the words tested. The maximum number of correct identifications for illiterate adults was ten. However, no reliable conclusion can be drawn from this experiment, since the illiterate adults that we found were simply not familiar with the words above the first ten, which were on the most basic level of vocabulary.

The results for the adults were inconclusive because illiterate adults in Taiwan are native speakers of Taiwanese (or other languages besides Mandarin), and many of the illiterate subjects were not fully fluent in Mandarin. Comparing their performance with that of fluent native speakers of Mandarin who are also literate does not create an accurate picture of effects of literacy on morpheme recognition.

3.3. EFFECTS OF LITERACY ON ANALYSIS. Subjects were classified in advance of morphological testing as to their level of literacy. The literacy test in the following table was used. The test consisted of ten sentences, numbered according to progressively more difficult reading material. A subject unable to read even the first sentence was labeled ‘o’ for literacy. Those able to read the first sentence were labeled ‘1,’ and so on.

識字測驗:

1. 小朋友，拉拉手，一二三，來唱歌，我們都是好朋友。
2. 小花貓，跑跑跑；小兔子，跳跳跳。
3. 我們可以整天奔跑，卻不感到疲憊、厭倦。
4. 我最難忘的是那一塊紅磚砌成的牆，和庭前爬滿綠藤的絲瓜棚。
5. 傲骨不可無，傲心不可有；無傲骨則近於鄙夫，有傲心不得為君子。
6. 災難之後，群情鼎沸，身為行政長官的他，為了安撫人心，頻頻向悻悻的群眾致歉。
7. 「搶孤」儀式，印證著先民拓墾台灣的華路藍縷、艱苦卓絕，自有其歷史傳承與文化認同上的背景與價值。
8. 因為深恐孤魂遊鬼內心悲怨、作祟加害，所以歷代地方官都必須率同百姓予以祭拜，企求合境平安、瘴厲不作。
9. 鉶之罄矣，維罍之恥。鮮民之生，不如死之久矣。無父何怙？無母何恃？出則銜恤，入則靡至。
10. 自余為僇人，居是州，恆惴慄；其隙也，則施施而行，漫漫而遊。

Table 2. Literacy test.

The children who took part in this study ranged in literacy from '0' to '4'. The adults ranged from levels '0' to '10'.

While the cognitive development of children in the age group tested is still rapidly progressing, there is good reason to believe that the differences in performance observed were not due to cognitive development independent from the acquisition of literacy³. The subjects were normal kindergarten and elementary school children with no cognitive impairments. The morphemes they were being asked to recognize were part of their active vocabulary. The social and conversational skills of the children were comparable. Among the children tested, age was not a determining factor for success in morpheme recognition.

The issue with regard to literacy is as follows: do the more literate subjects enjoy a higher level of morphological transparency than those who are pre-literate? The answer is not altogether clear. Of the sixteen pre-literate children, only one was unable to give any correct definition. Of the fourteen reading children, two were unable to give any correct definition, one with a reading level of '2' and another of '3'. The maximum number of correct definitions given by pre-literate children was five. Only one of the pre-literate children attained to that level. The child, identified as 15, was able to correctly define all five of the first targeted morphemes, labeled <basic>. There were eight pre-literate children who correctly defined three of the targeted morphemes. Four of the pre-literate children correctly defined two of the targeted morphemes. Only two of the pre-literate children correctly defined one targeted morpheme.

Results among the literate children for definitions were not significantly different. Of the fourteen reading children, two were unable to give any correct definition,

one with a reading level of '2' and another of '3'. The maximum number of correct definitions given by a reading child was six; this was the achievement of the subject identified as 20, whose reading level was '2'. But the child 30, who had the highest reading level, level '4', was able to give only three correct definitions. Three of the literate children gave four correct definitions. They all had a reading level of '2'. Four of the readers gave three correct definitions. Two of these had a reading level of '2', one was at '3' and another at '4'. Two subjects with a reading level of '2' gave two good definitions. There was only one literate subject who gave exactly one good definition. His reading level was '2'.

The results for definitions are not entirely reliable as indicators of morphological transparency. As already noted in the previous section, the process of defining a lexical component is meta-linguistic. It requires a level of sophistication that is more than most native speakers of any language ever attain. For this reason, when used alone as a measure of componential transparency, definition is an inadequate measure.

Significantly more of the literate children gave a higher number of good examples of the targeted morpheme in other compounds. The pre-literate children gave an average of 4.6 correct examples. The literate children gave 7.6 correct examples on average. It seems likely that the above result is due to the fact that the literate children may have encountered the morphemes in question in more combinations and may have been given better insight into morphological identity by knowing which written character was used for which morpheme in different compounds.

The tests with adults were inconclusive, unlike those with the children, because there was not as significant a difference between the definition and the identification test and only the first test items were accessible to the non-reading adults. It appeared that the illiterate adults simply did not know the test words above the first ten most basic items. Part of the difficulty in getting reliable data was caused by the fact that illiterate subjects in Taiwan are not native speakers of Mandarin, the test language. As such, they are not on a par in word recognition with their literate counterparts. This problem was not encountered with the pre-literate children.

4. DISCUSSION. The nature of this project changed considerably in the implementation. For instance, it was not originally intended that the Chinese portion of the experiment be focused primarily on literacy. While the subjects were divided into literate and non-literate groups, the vocabulary was also divided into basic, intermediate and advanced. It was hoped that differing contexts for vocabulary items would provide examples of circumstantial versus psychological opacity. However, in the case of Chinese, all that we managed to show was that those who had greater experience with the morphemes in different combinations were better able to identify them than those who had less experience. Less literate subjects had less experience with the systematic deployment of morphemes as subunits of syntactic words. They were thus capable of knowing a word without knowing its parts, or being able to say where else those parts were employed in their own vocabulary. For non-literate Chinese speakers, syntactic

words are often monolithic wholes, despite the fact that this is an isolating language where morphemes and syllables are in one-to-one correspondence.

The theoretical implications of the above observations are not entirely trivial. If we assume with Heine that the more opaque a derivation is to native speakers, the more lexicalized is the vocabulary item, we might then conclude that the more literate a Chinese speaker is, the less lexicalized is his vocabulary. While the grammaticalization literature does not address these issues in terms of individual speakers, there is no reason why it should not. Is lexicalization a historical, monolithic process that goes in the direction of opacity? If so, how is it that during a lifetime of language use, individual speakers can gain insights into the structure of their language, rendering derivation more transparent? How is it that the same speaker can experience different degrees of lexicality for the same sequence of morphemes depending on literacy? These are questions that should be addressed in further research.

In Chinese, where the writing system displays a one-to-one correspondence of character to morpheme, literate native speakers have a considerable advantage over native speakers who are not literate in recognizing the components of a word, even when homonyms are involved.

5. CONCLUSIONS FROM THE EXPERIMENT. Instead of the expected results concerning variation in opacity between basic versus advanced vocabulary, it was found that morphological opacity correlates with lesser degrees of literacy, regardless of the difficulty of a vocabulary item. This finding challenges theories that link the degree of lexicalization of a word with its degree of componential opacity.

'The grammatical identity of the word is what marks it for availability and selection for use in a syntactic slot.' (Packard 2000:80). Lexical status remains unchanged for speakers despite the fact that during a lifetime of learning a higher degree of morphological transparency may be attained. More literate subjects may have a better idea what the parts of a word contribute to the whole, but they do not experience any reduction in their ability to employ lexemes as syntactic units. Lexicalization and lexicality should be reexamined in view of these facts.

6. IMPLICATIONS FOR LEXICALIZATION THEORY. Componential opacity is something that often happens after lexicality on the syntactic level has been achieved. Opacity is not a prerequisite to lexicalization, though it frequently is one of its after-effects. The degree of opacity that accompanies lexicality varies from language to language and from speaker to speaker.

Opacity does not constitute lexicality, nor does it bring lexicalization about. Lexicality invites opacity, as the individual meaning of morphemes is overshadowed by the meaning of the word as a whole. But lexicality does not require speakers to be ignorant of componential semantics; and learning more about the meaning of components does not lead to delexicalization.

- ¹ Under Taiwan National Science Council Grant # 89-2411-H-126-020, the project had three components: Chinese, English and Hebrew. This paper deals only with the Chinese data.
- ² The sex of the child is not noted. No statistical significance was found by sex.
- ³ Literacy in and of itself has some effect on cognitive development, so that literacy and cognitive ability are not always separable. Educated subjects may appear more intellectual despite equal cognitive endowment with their less educated contemporaries. This is true for adults as well as children. There was no indication that the less literate children in this study were less literate because of any cognitive delay or impairment, nor were the more able readers demonstrably further advanced in other areas. (One of the best readers among the children, for instance, learned to read at home, before starting school. Home environment plays a big role in literacy.)

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ACOUSTIC REALIZATION OF PROSODIC TYPES: CONSTRUCTING AVERAGE SYLLABLES

MASAHIKO KOMATSU
University of Alberta
Sophia University, Japan

TAKAYUKI ARAI
Sophia University, Japan

LANGUAGES ARE CLASSIFIED in terms of accent (stress accent, pitch accent, and tone accent) and rhythm (stress-timed, syllable-timed, and mora-timed)¹. Although there have been comparative studies of specific languages, they have not offered the whole picture of prosody including both accent and rhythm in terms of purely acoustic parameters, or the 'acoustic map of prosody' (Figure 1, overleaf).

Previous studies have not provided a clear acoustic definition of prosodic types. For example, concerning accent types, Eady (1982) compared the pitch of Chinese (a tone accent language) and English (a stress accent language). Because he analyzed only these two languages, pitch accent (e.g. Japanese) is not taken into consideration, and it is not clear whether his results reflect only accent types or they are also affected by difference in rhythm between the two languages. It should also be mentioned that his analysis is limited to only global characteristics of pitch. As to rhythm types, Ramus et al. (1999) proposed the variations of consonant durations and the proportion of vowel durations in speech as measures of rhythm types, based on the analysis of several languages, including English, Spanish, and Japanese. However, their analysis is not purely acoustic because they assume phonological segments, and phonological judgment intervenes in identifying consonant and vowel intervals in the speech signal. Traditionally, the acoustic correlates of rhythm types are controversial.

This paper seeks to identify acoustic measures quantitatively representing the accent and rhythm types, investigating samples from Chinese, English, Japanese, and Spanish. The paper presents two proposals on the acoustic analysis of prosodic types. The first one deals with 'what to analyze.' We propose that pitch, intensity, and Harmonics-to-Noise Ratio (HNR) should be analyzed. Such *acoustic elements* constitute the characteristics of prosodic types. Next, we propose 'how to analyze.' While some of the *global characteristics* predicted from previous studies seems effective; simple statistical calculations of acoustic elements, such as mean and standard deviation, do not necessarily characterize prosodic types. Specifically, we emphasize the importance of *local characteristics*, such as histograms of rate of change in pitch, stylized pitch line segments, instantaneous harmonics-noise plots, and average syllables. (Henceforth, global and local characteristics are called *acoustic characteristics*.) Although we have not reached a definite answer to the question of what the acoustic correlates of prosody are, we propose several prospective methods to analyze such characteristics.

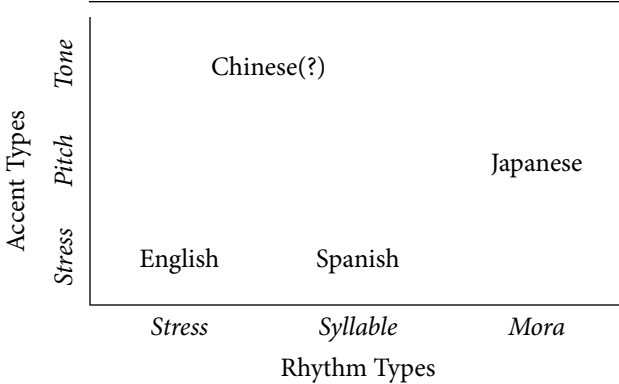


Figure 1. Image of an ‘acoustic map of prosody.’ Each dimension should be related to one or more acoustic parameters. The classification shown in the figure is tentative and should be further investigated.

1. DATA AND SIGNAL PROCESSING.

1.1. DATA. Speech data used in this paper, except the samples in Section 4.1, were taken from a multilingual speech corpus (Itahashi 2002). Of the eleven languages the corpus includes, Chinese, English, Japanese, and Spanish were used. The material used was the reading of the text ‘The wind and the sun’ in each language, which was approximately 30 seconds long on average. The text was read by native speakers of each language: Chinese 6 males and 7 females, English 3 males and 4 females, Japanese 6 males and 6 females, and Spanish 4 males and 5 females. All of these data were used unless otherwise noted. The data format was 16 kHz, 16-bit.

1.2. ANALYSIS. Praat Version 4.0.18 (Boersma & Weenink 2002) was used to extract pitch, intensity, and Harmonics-to-Noise Ratio (HNR) from the speech signal. The analysis was carried out frame by frame at a time step of 10 ms. (Henceforth, each analyzed section in speech is called a frame; in other words, frames were shifted by 10 ms in the analysis procedure.) Stylization of pitch by line segments was also conducted using Praat. The output of Praat was further processed for descriptive statistical calculation and graphic representation mainly by scripts in Matlab. If the frames that did not have an amplitude above 1/10 of the global maximum continued for 200 ms or more, they were regarded as pauses and eliminated from the analyses.

Because this is a pilot study, errors in pitch estimation by Praat were not modified. We consider that the errors did not have significant effects on our analyses because they were not frequent.

1.3. SYNTHESIS. We synthesized four types of speech samples from the original speech for the discussion in Section 2:

1. Sounds that retain only the pitch of the original speech. These are expected to carry information on accent and intonation.

2. Sounds that retain only intensity.
3. Sounds that retain intensity and HNR. The combination of intensity and HNR is expected to provide perceptual cues to phoneme classes.
4. Sounds that retain all three, i.e. pitch, intensity, and HNR.

All of these were created by a script of Praat. The script first calculated pitch, HNR, and intensity of the original speech. Then it created the four types of sounds based on these measures.

The sound with only pitch is simply a pulse train with a constant amplitude. Pitch was interpolated where it was not available in the original signal, e.g. for voiceless consonants. As noted above, if amplitude less than the threshold continued for 200 ms or more in the original signal, this section was regarded as a pause and suppressed to silence in the output sound. Finally, the sound was de-emphasized, i.e. tilted -6 dB per octave, to make it sound like a human voice.

The sound with only intensity was made by being driven by white noise. It was de-emphasized as well.

The sound with intensity and HNR is a mixture of a pulse train and white noise. From intensity and HNR, the amplitudes of a harmonics component and a noise component of the original signal were calculated respectively. Then, a pulse train was made based on the amplitude of the harmonics, white noise was made based on the amplitude of noise, and they were added together. The pulse train had a flat pitch. Finally, the sound was de-emphasized. The process of de-emphasizing caused a small change in HNR, but this did not make much audible difference.

The sound with pitch, intensity, and HNR is the same as the above sound except that the pulse train was made so as to keep the pitch of the original sound.

All of these sounds have a spectrum smoothly declining at -6 dB/oct. The sound with pitch, intensity, and HNR corresponds to the 'source' of a vocoder or the source-filter theory.

2. ACOUSTIC ELEMENTS. We propose that pitch is associated with accent types and that intensity and HNR are associated with rhythm types.

Accent types are expected to be characterized by pitch, following Eady (1982).

Rhythm types are, according to Ramus et al. (1999), characterized by the variations of consonant durations, the proportion of vowel durations, etc. We adopted intensity and HNR as acoustic measures indicating the degree of 'consonantal' and 'vocalic.' Intensity is closely related to sonority. Vocalic sections in speech have greater intensity, and consonantal, less intensity. HNR is the ratio of the amplitude of harmonics (i.e., periodic components) to the amplitude of noise (i.e., non-periodic components). Vocalic sections have a higher HNR, and consonantal, a lower HNR.

We synthesized the four types of sounds that include the above acoustic elements, as described in Section 1.3, for the first 10 seconds of speech of one male and one female from each language. As a trial, we used only one male and one female, and this proved the validity of the technique. It was confirmed that we can distinguish one

language from another (i.e., one prosodic type from another) by listening to these sounds. (The relation of the combination of acoustic elements and the identifiability of specific prosodic types is our future research theme.)

3. ACOUSTIC CHARACTERISTICS: GLOBAL AND LOCAL.

3.1. PITCH.

3.1.1. REPLICATION OF EADY'S EXPERIMENT (1982). Several values shown in Eady (1982) were calculated for our data: DURATION (the total duration of the speech signal), MEANFF (the mean F0 for voiced speech), SDF (the standard deviation of F0 for voiced speech), RCFF (the average rate of change in F0 for every 10-ms interval of voiced speech), and FLUXSEC (the average number of fluctuations per second in the F0 pattern). Of these parameters, Eady's result showed a difference in MEANFF, RCFF, and FLUXSEC between Chinese and English.

Our result generally conformed to Eady's, though not perfectly, and it also gave additional insights. RCFF showed a difference between Chinese and English, as in Eady's result, and the values of Japanese and Spanish were located between Chinese and English. This suggests that RCFF is an important characteristic of accent types. FLUXSEC showed a difference between Chinese and English, but the differences between speakers' genders in Japanese and Spanish were equally large. It should also be noted that FLUXSEC seems to be susceptible to its calculation algorithm. MEANFF and SDF did not show a clear difference across languages. DURATION showed a clear difference across languages, but it is likely to be the reflection of the lengths of the texts read rather than of prosodic types. It should be noted that RCFF and FLUXSEC are related to local shapes of pitch contours, although they are globally averaged values. The results together suggest that how pitch changes locally is important rather than its global values.

3.1.2. HISTOGRAMS OF RATE OF CHANGE IN PITCH. Because the importance of local characteristics was suggested, we scrutinized RCFF more in detail, even though Eady gave only the average values of RCFF. Figure 2 shows the distributions of RCFF. (We used 3 males and 3 females for each language to balance the number of speakers represented in each graph.) The asymmetry of positive and negative values is seen in all of the four languages, which indicates that pitch falling is more frequent than pitch rising in any language. Another important observation is that this asymmetry is larger in Chinese and Japanese than in English and Spanish. This may be relevant to the fact that pitch bears the function of distinguishing words in Chinese and Japanese.

3.1.3. DISTRIBUTION OF STYLIZED LINE SEGMENTS OF PITCH. Further, local shapes of pitch change were investigated. Original pitch contours were stylized by line segments (resolution: 2 semitones), as illustrated in Figure 3. Figure 4 shows the distribution of stylized line segments (3 males and 3 females for each language). Each dot represents a line segment. Dots with larger values of time (*x*-axis) indicate longer line segments; that is, pitch changes slowly or does not change for a long period of time. Dots with

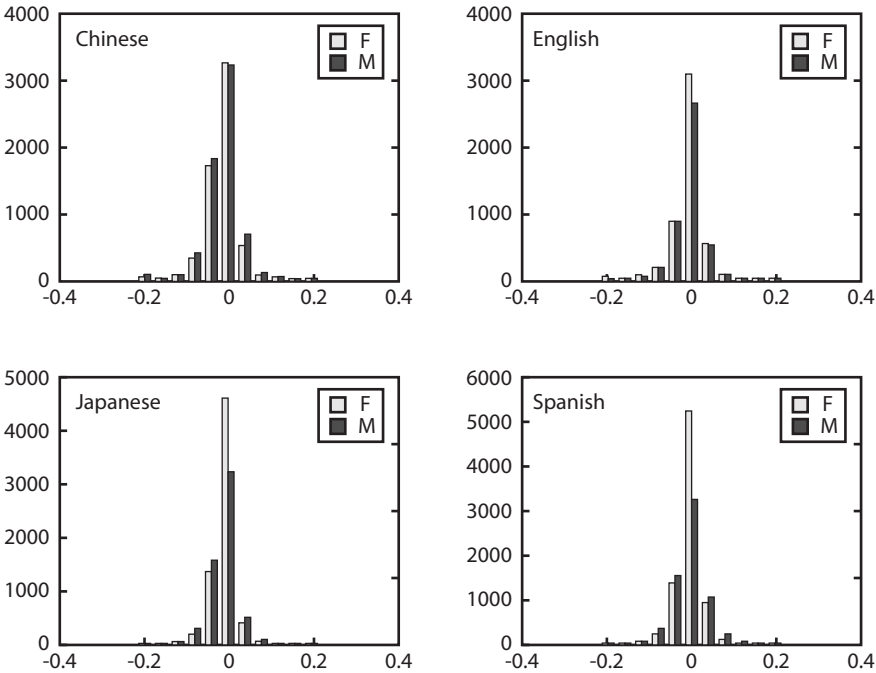


Figure 2. Histograms of *RCF*. x-axis: Pitch change per 10 ms ($\log_2[\text{Hz}]$); y-axis: Number of frames.

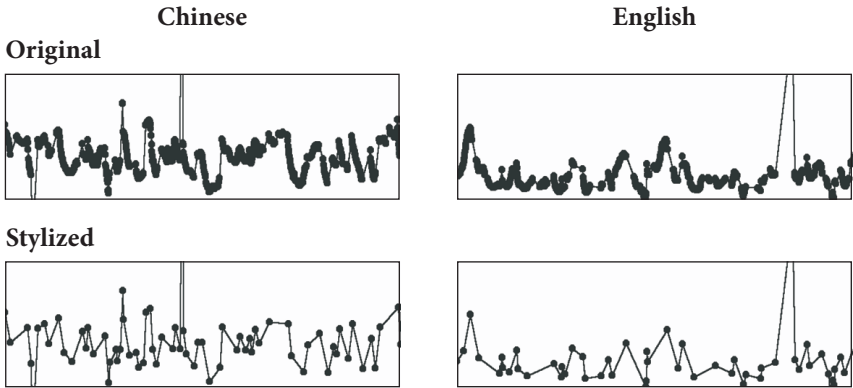


Figure 3. Stylization of pitch. x-axis: Time; y-axis: Pitch.

larger values of F_0 change (y-axis, positive or negative) indicate a quicker change of pitch (rising or falling). Note that extreme values of pitch change (e.g., greater than 1 or less than -1 in y-axis) may have been caused by pitch estimation errors.

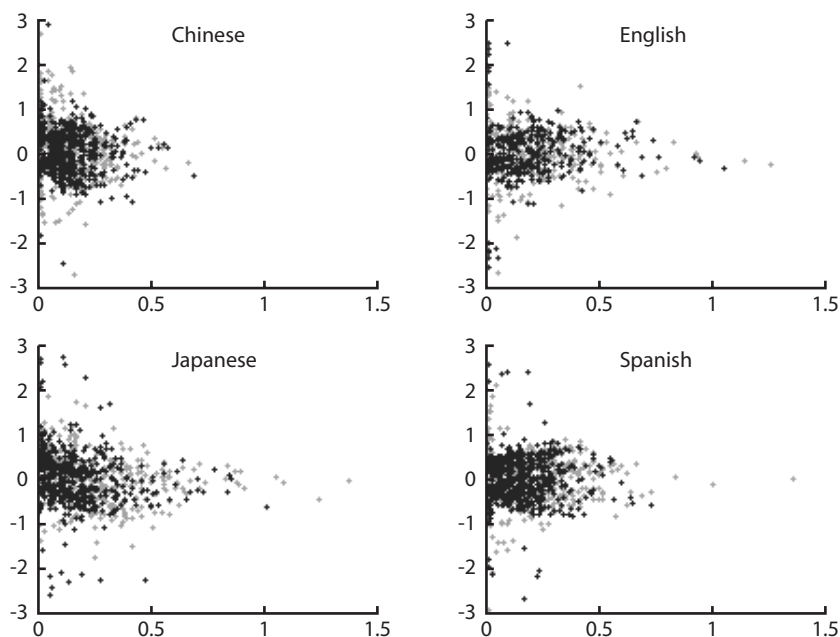


Figure 4. Distribution of stylized pitch line segments. x-axis: Duration of line segments (sec); y-axis: Pitch change of line segments ($\log_2[\text{Hz}]$). Darker dots indicate frames from male speakers; less dark, female speakers.

Figure 4 shows that Chinese has many rapid changes in pitch. In contrast, English has many slow changes. Japanese shows a characteristic between Chinese and English. Spanish seems similar to English, but may have more quick and small changes.

3.2. INTENSITY AND HARMONICS-TO-NOISE RATIO.

3.2.1. MEAN AND STANDARD DEVIATION. Means and standard deviations of intensity and HNR were calculated for each language. The results did not show a clear difference among the languages. Japanese showed a slightly larger standard deviation in intensity, which was contrary to our expectation that Japanese would show a smaller standard deviation because it sounds more monotonic than the other languages. Such results suggest that the global analysis of intensity and HNR does not capture the prosodic difference.

3.2.2. INSTANTANEOUS INTENSITY OF HARMONICS-NOISE. Ramus et al. (1999) claim that languages of different rhythm types have different proportions of consonant and vowel durations in speech. Hence, we plotted the amplitudes of harmonics and noise to see the distribution of 'consonantal' and 'vocalic' frames (3 males and 3 females for each language). In Figure 5, dots higher and to the right in each graph indicate frames of greater intensity. Those located toward the top left indicate frames that have lower

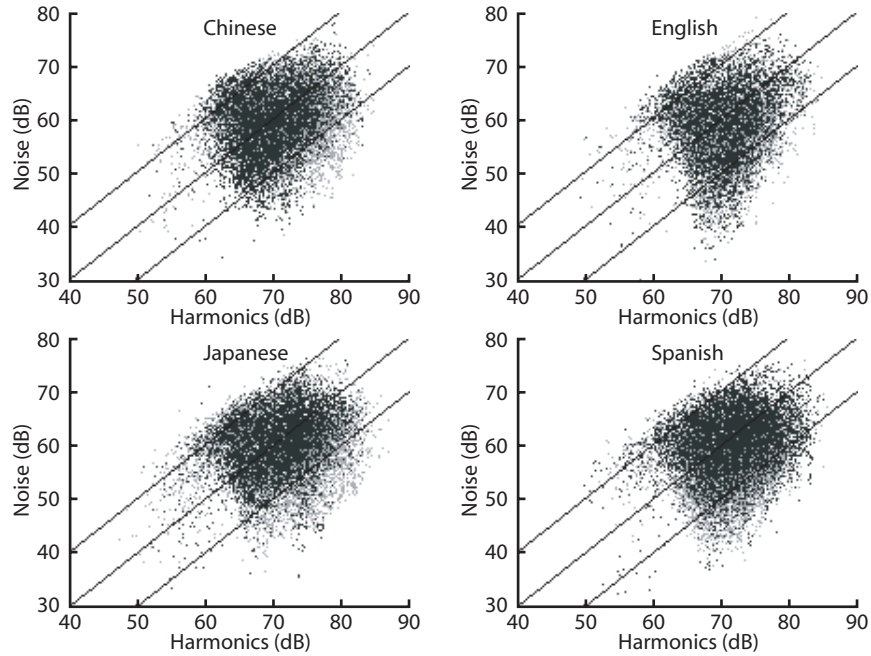


Figure 5. *Instantaneous intensity of harmonics-noise. x-axis: Amplitude of harmonics (dB); y-axis: Amplitude of noise (dB). Three auxiliary straight lines in each graph indicate HNR of 0, 10, 20 dB, respectively. Darker dots indicate frames from male speakers; less dark, female speakers.*

HNR (more consonantal), and those toward the bottom right indicate higher HNR (more vocalic). Three auxiliary straight lines in each graph indicate HNR of 0, 10, 20 dB, respectively.

These graphs clearly support the claim of Ramus et al. (1999) that English has the lowest proportion of vowel durations, Spanish has the next, and Japanese has the largest. The inverted triangle shape of the distribution of dots in the English graph clearly shows that English has a larger proportion of consonantal frames than vocalic ones. The Japanese graph shows that Japanese has a more equally balanced distribution of consonantal and vocalic frames. The shape of the distribution in Spanish falls between English and Japanese. The shape in Chinese, which is not analyzed in Ramus et al., may look similar to Japanese or Spanish, but it is not clear.

4. TIME ALIGNMENT OF LOCAL CHARACTERISTICS.

4.1. SMEARING OF LOCAL CHARACTERISTICS IN LONG-TERM ANALYSIS. In this section, we present an example indicating that a local characteristic is smeared in a long-term analysis, which shows the importance of the time alignment of characteristics in analysis.

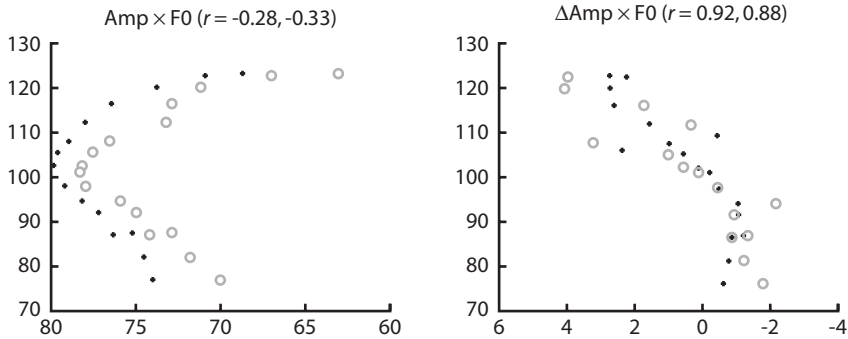


Figure 6. Interaction of amplitude and pitch in isolated utterance of the word *pat*. Left panel: x-axis: Amplitude (dB); y-axis: Pitch (Hz). Right panel: x-axis: Differentiation of amplitude per 10 ms (dB); y-axis: Pitch (Hz). '+' (black) indicates the interaction of intensity with pitch; 'o' (gray), harmonics amplitude with pitch.

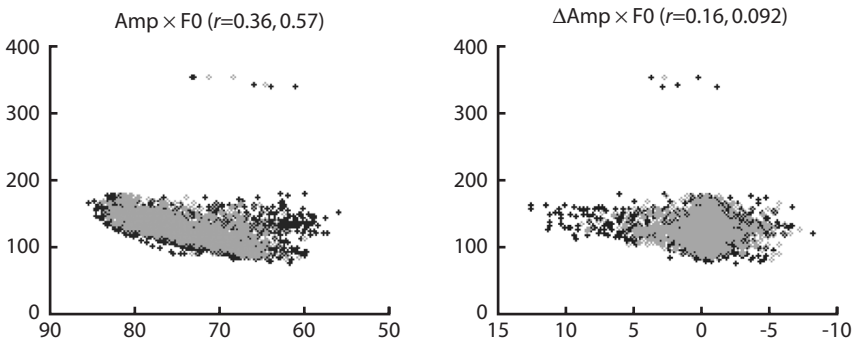


Figure 7. Interaction of amplitude and pitch in continuous speech. Legends are the same as Figure 6.

Figure 6 shows the interaction of intensity and pitch in the voiced section of the word *pat*. (Speech data is from our own recording.) In this example, intensity goes up from a low value, reaches a peak, and goes down, while pitch continuously goes down. If the amplitude is differentiated, it shows a strong correlation with pitch, such that the faster the amplitude goes up, the higher the pitch is; the faster the amplitude goes down, the lower the pitch is (see the right panel). The same characteristic was observed also in other words, such as *clap* and *splash*. This characteristic may be related to the nature of stress accent in English.

However, when the same analysis is applied to a whole continuous speech sample, such a characteristic is totally smeared, as shown in Figure 7. (Speech data are from Chino 1993.) To capture such syllable-wide characteristics, simple global statistical

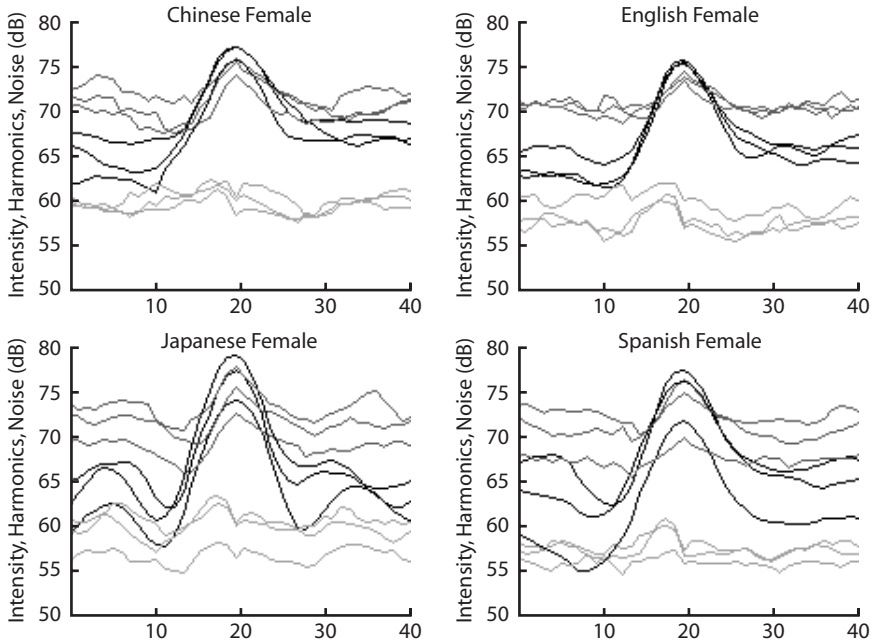


Figure 8. Averaged syllables (Female; Intensity, harmonics amplitude, and noise amplitude). x-axis: Frame number (1 frame = 10 ms); y-axis: Amplitude (dB). The darkest lines indicate intensity contours; medium lines, harmonics amplitude; palest, noise amplitude.

calculations are inadequate, and some operations for the time alignment of local characteristics are necessary.

4.2. AVERAGED SYLLABLES. Figure 8 shows averaged contours of intensity, harmonics amplitude, and noise amplitude (dark lines, medium lines, pale lines, respectively), which show the averaged shapes of syllables. Each graph shows averaged contours from three speakers (Hence, there are three lines for each type of contour).

These contours were calculated in the following way: First, an automatic algorithm selected from the speech signal 400 ms sections (40 frames) whose center is a local peak of the contour of harmonics amplitude. Next, the contours of intensity, harmonics amplitude, and noise amplitude were averaged across these sections. The result is that these contours are time aligned at the peaks of harmonics amplitude that can be regarded as syllable centers.

A universal characteristic of syllables is observed in these contours. See the Chinese graph (top left panel) for illustration. In the x-axis, 20 (the 20th frame) is the center of the averaged syllables. In the region of 10–20 in the x-axis, intensity is smaller and noise is greater than in 20–30 in the x-axis. This indicates that the syllable onset tends to have more consonantal elements, and that the syllable coda tends to

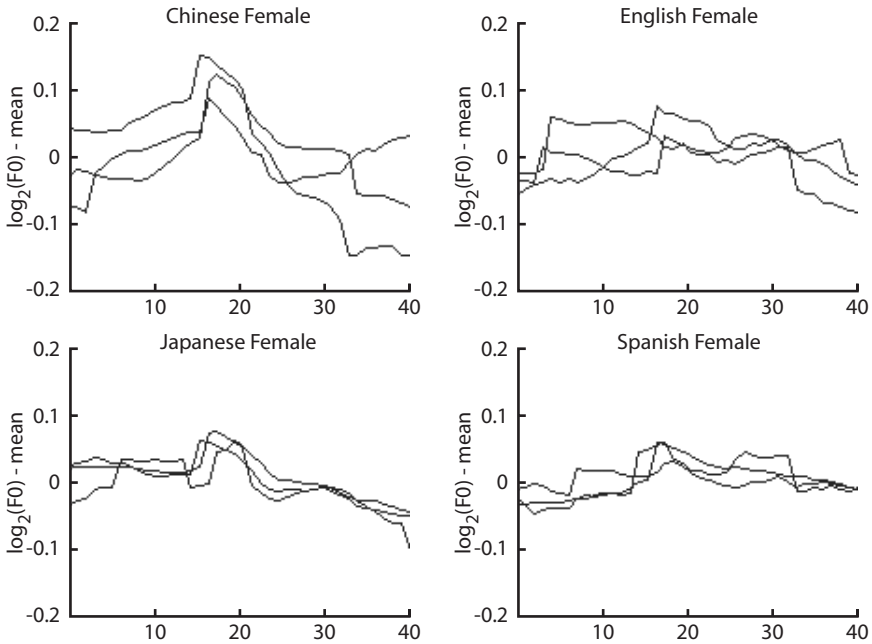


Figure 9. Averaged syllables (Female; Pitch). x-axis: Frame number (1 frame = 10 ms); y-axis: Normalized pitch ($\log_2[\text{Hz}]$).

have more vocalic elements, such as the ending part of diphthongs, nasals, etc. Such a tendency can be observed in other languages, too.

Such representation also shows cross-linguistic differences. In Japanese, clearly there are bumps before and after the center peak (around the 5th and 35th frames). This indicates that Japanese syllables occur fairly regularly in time. Such bumps are also observed in Spanish, although they are less clear. (They are not well seen in Figure 8, but are clearer in a graph of males that is not included due to space limitations.)

Figure 9 shows the averaged contours of pitch. Chinese shows a tendency to large pitch falling within a syllable, and Japanese shows a smaller falling. English does not show such a tendency. In Spanish, it may be even considered that pitch tends to rise across consecutive syllables in some speakers. Such cross-linguistic difference is congruent with the asymmetry of positive and negative values of RCFP mentioned in Section 3.1.2.

5. CONCLUDING REMARKS. First, we proposed that pitch, intensity, and HNR are acoustic elements related to prosodic types.

Next, we have extracted local characteristics (histograms of RCFP, stylized line segments of pitch, and instantaneous intensity of harmonics-noise) as well as global characteristics (mean, standard deviation, and others of Eady's parameters). We proposed methods to analyze these local characteristics. We have shown the importance

of local characteristics, or the 'distribution of parts', while indicating that some global characteristics, such as RCFF, may be useful as well. Finally, we proposed averaged syllables, which show the cross-linguistic difference of 'partial shapes' of acoustic elements as well as universal characteristics.

We have therefore extended Eady's F0 analysis on stress and tone languages to other prosodic types and proposed a more acoustic-natured measure than Ramus et al.'s rhythm analysis based on the phonological segmentation. We also introduced methods of analysis for local prosodic features; although we have not extensively discussed it in this paper, the literature suggests their importance (see Thymé-Gobbel & Hutchins 1996, etc.).

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EDDIES IN LANGUAGE AND BIOLOGY

ROBERT ORR

Ottawa

IT IS COMMONPLACE THAT LANGUAGE CHANGE does not move in a straight line. The history of almost any language can show instances where certain processes, forms, and categories go through periods of declining frequency and marginalisation, sometimes almost to the point of disappearance, followed by periods where such processes, forms and categories make a comeback, showing high degrees of productivity, often used in slightly different functions than previously. Sometimes, however, such processes are interrupted, and can only be reconstructed from the traces that they leave, often seen as irregularities or archaisms. It is the purpose of this paper to discuss examples of instances where certain morphemes, constructions, or lexical items underwent short bursts of productivity, and then receded, or did so as 'eddies' within a larger current, and suggest some parallels from evolutionary biology.

Lass 1990 develops the idea of marginal forms expanding far beyond their original range, and takes the term 'exaptation' from evolutionary biology (Gould & Vrba 1982), redefining it as 'the opportunistic co-optation of a feature whose origin is unrelated or only marginally related to its later use' (1990:80), or, in the words of his chosen title, 'How To Do Things With Junk'. He utilizes the concept to take a fresh look at two phenomena in Germanic where morphological 'junk' or 'trash' has been redeployed to make new distinctions, one from Common Germanic, and one from the recent history of Afrikaans. In a later work (1997:320–21) he suggests the development of secondary case endings in Finnish as a further example¹.

Janda (1996) in turn takes and further develops the idea of exaptation in linguistics from Lass (1990), and provides a substantial discussion of the phenomenon, taking her examples from Slavic, which offers a rich field for its study. She subdivides exaptation into three subheadings, discussing examples from each one: 1) 'the analogical extension of a morpheme from a closed class (the spread, varying in extent, of the old Indo-European 1st singular athematic ending *-m* < **-m* over West and South Slavic after a long period of decline)'; 2) 'the analogical extension of morphemes from a defunct paradigm (the spread of the old *ũ*-stem endings, to varying degrees, over the whole of Slavic)'; 3) 'the analogical extension of morphemes from a defunct category (the more limited, and more controversial in some instances, spread of the old dual endings)'.

Marcantonio (2002:209–12) cites Lass (1990) along with some other material, and goes on to apply the concept of exaptation to the development of the case system in Samoyedic. She (ibid:209) cites '...two major steps: a) the splitting of the original, more general senses of some of the original cases... b) building new subsystems through the combinations of old case endings or derivational and other kinds of formants'.

1. INTRODUCTION: 'EDDIES'. Sometimes, however, such processes do not take the full, logical course assumed by the authors cited above. There are also cases attested where marginal morphemes undergo short bursts of productivity, and then recede, within a larger current, sometimes even within wider exaptation-based spreads (see also Orr 1997:159-160 for further discussion). These might be described as 'eddis'.

At this stage a further, a more precise definition of linguistic eddis is in order. The Canadian Oxford dictionary defines *eddy* as:

'1. a circular or contrary movement of water causing a small whirlpool; 2. a movement of wind, fog or smoke resembling this. 3. a usu. relatively insignificant trend, opinion, mood, etc. going contrary to the prevailing currents of thought, attitudes, etc.'

I would like to supplement that definition by defining an eddy in historical linguistics as:

'any current that goes against the general trend of an overall linguistic change, or is at the periphery of such a change.'

An excellent example, using almost the same terminology, is provided by Žolobov (1998:187). As the loss of the dual progressed in Russian, its tendency to develop into a general paucal form was submerged in its more overarching tendency to be lost, although traces remain in the modern language: '...the incipient generalisation failed to spread, and was even reversed...' (translation by the author).

The historical nominal morphology of Slavic is full of examples of brief bursts of productivity in certain paradigms and categories, against a background of overall decline. Taking the longer view, reaching back beyond to IE, this overall phenomenon could also be described as 'rebound', and the individual instances as 'eddis'.

2. MORPHOLOGY.

2.1. COMMON SLAVIC Ů-STEMS. To develop one of Janda's examples, the spread of the original Slavic Ů-stem endings has not proceeded along a straight line. On several occasions there have been cases where certain endings have spread and then retreated. The history of the Common Slavic Ů-stem declensional class in Russian shows several examples of eddis involving individual endings, against the background of a more far-reaching expansion of the class as a whole. In Russian the Ů-stem genitive singular ending *-u* expanded during the Middle Ages from fairly modest beginnings, subsequently contracted, and is still doing so. At its height, around 16th century, the *-u* ending might have developed into a full-fledged partitive case (e.g., Russian *народ* (*narod*) 'people', genitive singular *народа* (*naroda*), but *много народу* (*mnogo narodu*) 'many people', cf. Finnish *talon* ('house.genitive') *taloa* ('house.partitive'), but it never took that step, and retreated (Kiparsky 1967:26-30; Vlasto 1986:92-93). Nowadays '...the replacement [of the *-u* ending]... [by the genitive] is far from complete [and in other contexts its replacement by the accusative] has reached an advanced stage'

(Ryazanova-Clarke & Wade 1999:261–64; see also Comrie, Stone & Polinsky 1996: 124–25; Wade 2000:76–77, 109–10), but within living memory there were still enough forms for the *ŭ*-stem genitive *-u* to be assigned separate status as a Genitive-II in Jakobson's (1932, 1958) system. The dative singular ending *-ovi* underwent a parallel advance, and a much more complete withdrawal, leaving behind only remnants (*домоу* (*domoj*) 'home' < **domovi*, *доноу* (*doloj*) 'down with' < **dolovi*), as did the *ŭ*-stem nominative plural ending *-ove* (now only preserved in forms such as *сыновья* (*synov'ja*) 'sons' < **synove* + *ja*)².

Some eddies are barely distinguishable from the respective overall currents of change of which they are a part. There is a hint that *-u*, now an inanimate ending in Slavic, may have briefly moved in the direction of becoming a masculine animate genitive-accusative singular (usually this case is has the form *-a*). Apart from the oft-cited examples of Polish *wół* 'ox' and (*ba*)*wół* 'buffalo' vs. genitive singular *wołu*, (*ba*)*wołu* respectively, there are also some rare examples of animate genitive-accusative in **-u* in Slovenian (see Ramovš 1952:38), e.g., *preiell ie suyga gofftu* 'he received his guest' (attested in Trubar)³. These examples, mostly fairly early (no animate genitives in *-u* in Slovenian have survived to the present), may be seen as trial-and-error-based contributions to the gradual process of generalising **-u* as an inanimate genitive singular ending.

Lithuanian has carried the development of extra cases further, with a new illative based on the accusative, a new allative based on the genitive, and a new adessive based on the locative (see Stang 1966:228–32 and Schmalstieg 1987:265–72), e.g., *galvą* 'head'; accusative singular *galvą*, illative singular *galvõn* (< *en* 'in'), genitive singular *galvõs*, allative sg *galvõsp* (< *pie* < *prie* 'at, before'), locative singular *galvojè*, and adessive singular *galváip* (also < *pie* < *prie*).

2.2. COMMON SLAVIC *Ū*-STEMS AND *S*-STEMS. The Common Slavic *ŭ*-stems are also interesting in this regard, as they went through a period of expansion, which may be seen as having *two* possible causes, which may have fed each other: 1) the development of an embryonic 'feminine virile subgender', mainly centred round the *ŭ*-stems (e.g., Old Church Slavonic (ocs) *jětry* 'woman's sister-in-law, husband's brother's wife', cf. Abernathy 1979:7):

'It accordingly becomes a legitimate question why the relatively minor class of *ŭ*-stems, which might have been expected to fade quietly from the scene (as in the longer run, it did) early in the process of reorganization of Indo-European declension in Slavic... instead succeeded for a time in holding its own and even getting its share of the lexical 'booty' which became available by reassignment of stems as the older system broke down.;

and, 2) an influx of borrowings from Germanic, e.g., Common Slavic **cĭrky* < Germanic **kirikō* 'church'; **buky* < Germanic **bōkō* 'letter'. In addition, the history of the *s*-stems in Common Slavic (Bernštejn 1974:162–63) offers a fair bit of evidence

that this declension, too, underwent bursts of productivity in certain peripheral areas of Slavic: South-West Slovenian (*kri* - *krvesa*), North-East Bulgarian, and Polabian (Bernštejn 1974:162–63). The **s*-stems probably exerted a supporting influence on various important morphological processes in the history of Common Slavic (see Orr 2000:98 fn).

Outside Slavic, the old Indo-European athematic 1st singular **-m* ending lost ground in most places, but the history of Lithuanian saw a phenomenon parallel to those we have been discussing: in historical times most of the athematics gave way to thematics, e.g., Old Lithuanian *mi* (cognate with OCS *ěmi*) has been replaced by *ėdu*. It might also be noted, however, that in Lithuanian this decline was preceded by an expansion (cf. Stang 1966:309–10). This process might be seen as an example of the phenomenon being proposed here, as might the emergence of the occasional new strong verb (e.g., *dug* (*digged*); *snuck* (*sneaked*)) in English against the background of the overall loss of the category of strong verbs.

3. SYNTAX: THE EVOLUTION OF *HAVE* OVER PART OF SLAVIC. Eddies may also be discerned in diachronic syntax. An example is furnished by the evolution of *have* over parts of Slavic. Three ways of expressing *have* may be reconstructed for the earliest Slavic:

1. *dative + be* construction, e.g., *mŭně estŭ*; Latin *mihi est*; Greek *μοί στί*, Old Irish *táth-um* (earliest reconstructible);
2. verb 'have', e.g., OCS *iměti*;
3. the preposition *u* 'at'.

It is possible that the earliest way of expressing 'have' in Slavic that can be reconstructed was to use a *dative + be* construction, e.g., *mŭně estŭ*; similar to the Latin *mihi est* and Greek *μοί στί*. Mrázek (1963:243) describes these constructions as 'very ancient' (translation by author) citing examples from Sanskrit, Greek, Latin, Gothic and Lithuanian. At the same time the earliest attested Slavic shows a verb 'have', e.g., OCS *iměti*⁴, which has evolved into the unmarked way of expressing *have* over most of West (e.g., Czech *míti*) and South Slavic (e.g., Slovenian *imati*), and part of East Slavic (e.g., Ukrainian *mamu*).

As is well known, there is a third way of expressing *have* in Slavic: the preposition *u*. This usage is most widespread in, but by no means restricted to, Russian, although examples can be cited from virtually every other Slavic language, with the apparent exceptions of Slovenian and Sorbian. In fact, it has been suggested that, within Slavic, the closer we get to Russian the use of *u* to express possession increases: in Polish there are a very few examples, with more in Ukrainian, and even more in Belarusian, forming a sort of continuum (for examples see Orr 1992:249–51 and the literature cited therein)⁵. Examples of the construction with *u* to express possession even appear in OCS, e.g.,

- (1) *ašte bodetǔiu etera člka r. ovecī*
 if will-be(at) certain man 100 sheep
 'If a certain man has a hundred sheep' (Assemanianus; Matthew 18:12)

The other ocs Gospel texts (e.g., Marianus) have *eteru člvku* (dative) here. Both locutions render the Greek:

- (2) *ν γένηται τινι θρώπωκατέν πρόβατα*
n génētai tini thrōpōikatén prōbata
 if will-become certain man-DAT hundred sheep

for which Mirčev 1971:79 provides the following Modern Bulgarian gloss:

- (3) *ako някой човек има сто овче*
ako njakoj čovek ima sto ovče

From the history of Bulgarian, we can see the constructions with *u* increasing in frequency by the Middle Bulgarian period, but subsequently becoming very restricted in scope; Modern Bulgarian now uses *имам* (*imam*) for 'have' in constructions similar to those found in Western European languages (cf. Mirčev's gloss cited above). Nevertheless, as Mirčev (1971:83) points out, this evolution was no means predestined; he asks 'why this phenomenon became widespread in Russian, while in Bulgarian its appearance was restricted, and followed by its complete disappearance' (translation by author)⁶.

Here, then, we have a clear example of an eddy in syntax.

4. LEXICON: DUTCH LOANWORDS IN RUSSIAN. Some minor 'eddiess' in language may even have been observable within a single lifetime. An interesting example, from several angles, is provided by the history of Dutch loanwords in Russian.

The mere presence of Dutch loanwords in Russian may be traced to one man: Peter the Great, and the time he spent in Dutch shipyards and with Dutch sailors. Dutch loanwords are only recorded in Russian between 1697 and 1724, a period roughly coeval with his reign. During this period many Dutch loanwords entered Russian, reaching a peak of over 1500, and in 1707 Peter even decreed that all Russians should learn Dutch, but after his death in 1725 knowledge of, and interest in, Dutch dropped off sharply. Most Dutch loanwords from the Petrine era have been lost, but some are still current, e.g., *зонтик* (*zontik*) < *zondek* 'umbrella', *каюта* (*kajuta*) < *kajuit* 'cabin', *пассажир* (*passažir*) < *passagier* 'passenger' and *Питер* (*Piter*) < *Pieter* (St. Petersburg) (see Kiparsky 1975:111–21). Some have remained in the language, but have undergone later modifications, undoubtedly driven by folk etymological identification with German⁷.

This is in contrast to Russian loanwords from, e.g., French, German, etc., where the existence of any single individual would have made no appreciable difference to the scope of such loanwords.

Certain processes in evolutionary biology may also be described as eddies. Fortey 1998:34 points out that life itself may have undergone an 'eddy' on Mars: it may have started, but never progressed beyond a very primitive stage, and then been lost again. Restricting ourselves to Earth for the purposes of this discussion, such 'eddies' can most clearly be discerned when life-forms are in the process of switching from one environment to another: aquatic animals taking to the land and then retreating, or land animals taking to the air and then retreating.

5. EVOLUTIONARY BIOLOGY: THE AQUATIC APE THEORY. One possible such phenomenon in human evolution, still controversial, is the theory that humans spent some time as partially aquatic mammals, and then returned to land, while preserving many of the features that point to an aborted evolution in the direction taken by whales, seals, and manatees—hairlessness, traces of webbing between the fingers, sensitivity in fingertips, tears, subcutaneous fat, large breasts, face-to-face copulation, etc.—(see, e.g., Hardy 1960 for the original exposition, Morris 1967:37–39 for some pertinent comments, Morgan 1972, esp. 19–55, 131–47; 1982, esp. 18–21, 43–47, 53–58, 62–64, 67–77, 79–87, 95–101, 103–22 for comprehensive development and synthesis, La Lumière 1982 for a 'geologically plausible locality' where the aquatic stages of human evolution might have taken place, and the papers in Roede 1991.)

Ellis (2003:243–56) allots some treatment to the aquatic ape theory, surveying the literature and offering new evidence, concluding that there has been no attempt to seriously debate the issue.

Morris 1967:38–39 concludes his discussion with the following comment, of interest to historical linguists:

'...despite its most appealing *indirect evidence*, the aquatic theory lacks solid support. It neatly accounts for a number of special features, but it demands in exchange the acceptance of a hypothetical major evolutionary phase for which there is no *direct evidence*. (Even if eventually it does turn out to be true, it will not clash seriously with the general picture of the hunting ape's evolution out of a ground ape...)' (emphasis added)

I would like to suggest that, phrased in this way, the aquatic ape theory bears a strong resemblance to reconstructions which are commonplace in historical linguistics (e.g., the laryngeal theory), and that researchers in evolutionary biology might apply this way of thinking to their own fields, and therefore be a little bolder in some of their hypotheses. In fact, in this context, Conway Morris 1999:141 discusses the phenomenon of trace fossils, which appear to be used by palaeontologists as a tool very similar to various forms of linguistic reconstruction: the marks left by various prehistoric life-forms of any given period (footprints, scratch marks) may be utilised as indirect evidence in reconstruction of important aspects of the respective life-forms⁸.

6. EVOLUTIONARY BIOLOGY: FLIGHT, AND ITS LOSS IN CERTAIN ENVIRONMENTS. The evolution of flight in certain types of dinosaur may also provide an example of an eddy in biological evolution. Recently, in a comprehensive, ground-breaking study of the evolution of flight in dinosaurs and birds (2002), which builds on earlier work, Paul has proposed that the attested fossil remains of several dinosaurs, including, e.g., dromaeosaurs ('raptors' in more popular terminology), and even possibly tyrannosaurs⁹, may be seen as examples of 'neoflightlessness', i.e., they point to the development of various attributes of flight, followed by a reversion to a state of flightlessness, similar to developments in the ratites. Features of the respective dinosaurs (e.g., brain development, olfaction, vision, and feeding habits) may be seen as remnants of the postulated earlier flying stage.

Much discussion of the evolution of flight has centred around the Archaeopteryx, conventionally assumed to be the earliest bird to emerge. In this context Paul (2002: 249) suggests that features found in certain postulated neoflightless dromaeosaurs may actually be attributable to descent from 'a more sophisticated flier than Archaeopteryx'. He also suggests that the conventional view of flight as a very difficult process may be erroneous (2002:131–32).

Paul develops this line of thought to suggest (2002:228–252, 288–292) that neoflightlessness may even offer a better explanation of the extant fossils than exaptation in certain cases: the short distally rigid tails found in dinosaurs, the length of their legs, and the configurations of ribs, arms and fingers, legs and toes, the configuration of the wishbone, breastplates, and the configuration of the tail feathers.

The following quotes may be taken as summaries of the issue, incidentally pointing to another possible eddy in biological evolution: 'Flight and its loss offer a single, eminently logical explanation for the evolution of all birdlike pectoral, brachial, and dermal adaptations seen in avepeptoran dinosaurs' (2002:232); 'Early flight loss should be no more surprising than the fact that soon after the first tetrapods crawled onto land, some of them were readapting to a fully aquatic lifestyle... Being not that far from fish, these tetrapods had no difficulty returning to the water¹⁰. Being little different from terrestrial avepods, the long-tailed, longer-fingered dino-birds found the arduous demands of flight easy to relinquish. Note that only one of the many flying mid-Mesozoic avepeptorans needed to lose flight in order for a diverse radiation of secondarily flightless forms' (2002:288).

Taken as a whole, these developments may also be seen as forming an example of an eddy. As Paul (2002:232) points out in this context: 'Ultimately, it is the totality of the evidence that is most telling.'

7. CONCLUSION. The above examples are a vivid illustration of an apparent major difference between historical linguistics and evolutionary biology: time frames. For a long time it has been conventional that the emergence of a new species cannot be observed in a lifetime, while the emergence of a new language or dialect can. The *ü*-stem 'eddy' reconstructed for the history of Russian ran its course over about a thousand years, whereas the *first stage* of the evolution of the aquatic ape, which seems to have been

an 'eddy' in human evolution, would have taken about a million years, and may not have been played out yet (Morgan 1972:55, 131, 177). Recent work, however, shows that on some levels, both linguistic (Dixon 1997)¹¹ and biological (Palumbi 2000)¹², evolution may in some cases proceed much more rapidly than previously thought. Integrating these latest findings will be a challenge to any overall comparison of historical linguistics and evolutionary biology. The debates will doubtless continue.

¹ Actually, Lass 1990 is not the first mention of the application of exaptation to linguistics, although Lass may be the first to have applied it to actual grammatical terms. Quoting Alfred Russell Wallace, Shermer (2002:159) shows that the concept itself must have been around as far back as the mid-19th century. Sebeok (1986:15, 40), also citing Gould and Vrba loc.cit., actually discusses exaptation and adaptation, albeit only in general terms. In turn, however, the *concept* of exaptation also appears to have been current in biology before Gould and Vrba: Desmond (1977:153), discussing the evolution of flight, puts the issue thus, offering an excellent description for our purposes: 'each of the components that in totality were to lead to flight must originally have evolved for some purpose other than remaining aloft. *Only when all the requisite structures were present could they be switched to some new function*' (emphasis added). All that seems to be lacking is the term itself.

The concept of exaptation itself as applied to the evolution of flight has come in for some criticism, see Paul 2002:228–29, and below.

² In the context of eddies the evolution and current status of the original *ŭ*-stem ending locative singular ending *-u* in Russian is complex. As with the *ŭ*-stem genitive, it was utilised to make a further distinction within the old Common Slavic locative. Sometimes the new distinction is referred to as 'locative', called Locative-II in Jakobson's system, with the term 'prepositional' being used to cover the other uses of the old locative, cf. the distinction between abstract (prepositional) *я вижу что-то странное в снеге* (*ja vižu čto-to strannoje v snege*) 'I see something strange in the snow' (effects of light, etc.) and the concrete (locative) *я вижу что-то странное в снегу* (*ja vižu čto-to strannoje v snegu*) (a concrete object, animal, etc.). Locative-II has held its ground rather better than Genitive-II in Russian, and is therefore a less-clear-cut example of a linguistic eddy, although it might be included as part of a larger eddy: the expansion and subsequent decline of the Common Slavic *ŭ*-stem endings in Russian.

There has not been so much retreat and loss of forms in this instance, and this form might not be so easy to fit into an eddies-based framework as the other *ŭ*-stem endings discussed above.

⁴ In Orr 1997:156 (following Arcixovskij & Borkovskij 1958:61 on Novgorod Birchbark No. 177) I suggested that the form *Grigoriju* in

A	y	poš(l)i	Grigoriju	ωneθimova...
And	you	send-IMPERATIVE	Grigorija-ACC	Anfimov...

was an animate accusative in *-u*. More recent research (Zaliznjak 1995:609) shows that the form in question is in fact an *ā*-stem accusative (nominative *Grigorija*), thus providing a more plausible alternative explanation. Animate genitive-accusatives in *-u* are therefore restricted to Polish and Slovenian.

- ⁴ He also notes, *pace* Isačenko 1974:50, that оcs *iměti* 'have' is not always used to translate Greek *χεῖν* (*chein*) id., see also Mirčev 1971:80-81 for examples.
- ⁵ Examples are attested where *u* and *imati* seem to be almost interchangeable, e.g., Belarussian might use both *я маю брата* (*ja maju brata*) and *у мяне ёсць брат* (*u tjanje josc' brat* to render 'I have a brother'.
- ⁶ Modern Bulgarian restricts the dative of possession to relatives, e.g., *майка ми* (*majka mi*) 'my mother' (lit. 'mother to-me').
- ⁷ An example of this phenomenon is provided by *шмонор* (*štopor*) 'corkscrew' < Dutch *stopper*, first attested as such in the early 18th century. Later on, as knowledge of Dutch waned in Russia, it was believed that the 'correct' pronunciation was [štopar], based on German, although a form **Stopper* in the meaning 'corkscrew' is nowhere attested in German.
- ⁸ Diller 1997:6 suggests that the aquatic ape theory is at the same stage that IE laryngeals were before the discovery and interpretation of Hittite; I would be more cautious, as Hittite has created nearly as many problems for the laryngeal theory as it has solved.
- ⁹ Inclusion of the tyrannosaurs as neoflightless may seem startling at first sight, and in fact Paul (2002:236-37) ranks them as less likely to have been neoflightless than some other dinosaur groups. In this context, however, one cannot help remarking that Desmond (1977:174) notes some similarities between *Tyrannosaurus* and *Archaeopteryx* thus: 'The only way out of the paradox is to assume either that *Tyrannosaurus* perched in trees or that *Archaeopteryx* was a ground dweller. Since the first option is rather unlikely...', and suggesting that these similarities be viewed in a new light.
- ¹⁰ Recently Ellis (2003:139-267) has put forward a comprehensive discussion of the phenomenon of land animals taking up, or resuming, a partially or wholly aquatic existence, sometimes after a very short period on land. In every instance the evolutionary path was intricate, containing several eddies, as exemplified by the emergence of, e.g., marine iguanas (141-43), marine turtles (143-51), sea snakes (151-59), crocodiles (159-66), penguins (166-74), sea cows (176-82), sea otters (182-86), seals and sea lions (186-97), and cetaceans (202-41), to which he allots a detailed discussion. He points out that in some cases a short period spent on land may be considered an eddy, such as lungfishes (87-90) and some aspects of the emergence of the earliest amphibians (130-138).
- ¹¹ Dixon (1997:10) cites the situation on Woodlark Island, off New Guinea, where the language had changed to a point bordering non-comprehensibility within 15 years.
- ¹² Palumbi (2000) cites a wide variety of examples of evolution proceeding far more rapidly than previously suspected are cited, e.g. foxes (18-19), mustangs (23-25), etc. He suggests that Darwin badly underestimated the speed at which evolution could take place, and refers to 'Darwin's mistake.' (30-32).

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TOWARD LINGUISTICALLY PLAUSIBLE LANGUAGE MODELLING IN REAL-WORLD APPLICATIONS

GERALD PENN

Department of Computer Science, University of Toronto

THERE IS A GROWING AWARENESS among engineers working with speech and text that, in order for the functionality of current natural language applications to progress to the next level, access to thematic roles and grammatical function assignment, i.e., ‘who did what to whom’, will be just as important as a probabilistic model’s ability to predict the next word in a string. The latter is the current litmus test for ‘language models’, as these probabilistic finite-state or simple context-free grammars are almost mockingly called in engineering circles. In striving to represent meaning and discourse relations, these engineers and the annotated corpora they use are dutifully following the common assumption in the Chomskyan linguistic tradition that they are artifacts of configurational relations—primitives that are evident from the phrase-structure trees licensed by the grammar.

In the case of English, there have been some remarkable successes in the last five years. The most notable is that of Collins (1999) and several successive improvements, who used knowledge about headedness and subcategorisation, a traditional *n*-gram language model and some information about unbounded dependencies to dramatically improve a context-free parser’s ability to predict the most likely phrase-structure tree given a string of words — with the tacit assumption that this tree is sufficient to provide an interpretation. While there have also been more modest successes with purely dependency-based grammars in the realm of freer word-order (fwo) languages (Collins et al. 1999), even agreeing on what the best phrase-structure tree should be in these languages is not easy. Predicting it from data, moreover, seems utterly intractable, given the number of movement operations and empty projections involved.

In the ambitious hunt for such universals of syntactic structure across languages, however, some alternative structures from linguistic theory that maintain a closer relationship to the attested data in fwo languages have been neglected. These challenge the traditional view of constituency, in which word order, phrasal discontinuities, semantic interpretation, and discourse structure all happily agree on the compositional subunits to which their constraints refer.

This paper presents a new discrete language model for parsing that uses parallel phrase-structure-like trees, synchronised by grammatical constraints. It is inspired by these dissenting proposals, beginning with the distinction drawn by Curry (1961) between *tectogrammatical* and *phenogrammatical* structure. There is also a set of interpretation rules with primitives for stating *linear precedence* and *constituent liberation*, roughly in the sense of (Zwicky 1986). A naïve parsing algorithm and some details of an implementation of the model are also discussed.

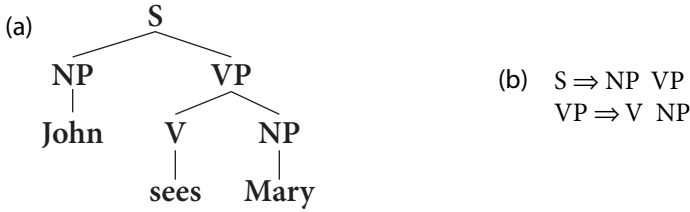


Figure 1. An example phrase structure tree (a) and its corresponding phrase structure rules (b).

1. PHRASE STRUCTURE GRAMMARS. Phrase structure trees, such as the example shown in Figure 1a, are constrained relative to the rules of a given context-free grammar, such as those shown in Figure 1b. These rules carry with them three implicit assumptions about constituency, namely:

1. constituents are realised as contiguous substrings,
2. constituents are internally ordered (by the right-hand-sides), and
3. constituents guide the assemblage of a semantic interpretation.

Simply put, the goal of the present study has been to characterise languages in which one or more of these three assumptions do not hold, while retaining access to semantic information.

2. PREVIOUS MODELS OF FREER WORD-ORDER. Previous models of FWO languages have typically been either very informal or, if formalised, rather superficial in their consideration of empirical data from attested languages. Many, for example, have taken the still-dubious existence of languages with completely free word-order for granted. They also have generally given attention to the relative linear precedence of constituents with very little regard for the contiguity of constituents. The principal exceptions to this are Zwicky (1986) and Reape (1994). Zwicky (1986) proposed that certain categories be designated as ‘liberated,’ which removed the requirement of contiguity on every instance of such a category in phrase structure. Reape (1994) uses a feature-structure-based system in which a binary-valued feature controls whether the substring corresponding to each subtree is contiguous and ordered, or merely ordered, in which case other substrings could be inserted among its words in the way that two stacks of playing cards can be shuffled together.

Some (Nash 1980; Barton, Berwick & Ristad 1987) posit no linear precedence whatsoever—phrase structure grammars were simply reduced to specifications of mother-daughter category relationships in trees, later called *immediate dominance* (ID). Many others relax or require explicit statements of linear precedence (LP), most notably the ID/LP (Gazdar et al. 1985). This has enjoyed very wide usage in linguistics, although with some ambiguity as to whether (1) its (relative) linear precedence statements (such as ‘NP < VP’) are intended to be quantified over all immediate dominance rules

<i>Dem Mann</i> (to) the man	<i>habe</i> have	<i>ich das Buch</i> I the book	<i>gegeben</i> given	
Vorfeld	left Satzklammer	Mittelfeld	right Satzklammer	Nachfeld

Figure 2. A topological analysis of a simple German sentence.

and/or over all NPs and VPs in the same rule, if more than one occurs, (2) its truth requires the existence of its argument categories, and (3) its argument categories must be distinct. The last point is important when non-atomic categories that can partially overlap in their denotations, such as feature structures, are used.

3. TOPOLOGICAL FIELDS. There are some empirically attested cases of freer linear precedence constraints for which the < operator is ill-suited. This is primarily because < is a statement of *relative* precedence between two constituents within some pre-defined region—in the case of ID/LP, for example, within the region spanned by the left-hand-side constituent of the phrase-structure rule.

3.1. EXAMPLE 1: THE GERMAN MITTELFELD. Traditional nineteenth century analyses of German sentence structure, for example, distinguish a linear topology that can be applied to every German clause, as shown in Figure 2.

This topology is distinguished by a region, called the *Mittelfeld*, which is bracketed on the left and right (left and right *Satzklammer*) by a closed class of categories, mostly verbal, as is the case in Figure 2. In matrix clauses, a topic position appears before this bracketing, called the *Vorfeld*. Another field at the end (*Nachfeld*) receives clausal arguments and adjuncts of the main verb, as well as prosodically heavy arguments and relative clauses of NPs that have been raised.

A number of linear precedence constraints exist within the *Mittelfeld*. Pronouns, for example, precede prosodically heavier noun phrases in this field (occurring just after the left *Satzklammer*). Pronouns also occur relative to each other in a pre-defined order. Temporal adjunct phrases generally precede locative adjunct phrases. These constraints only pertain within the *Mittelfeld*, however—nearly every constituent mentioned can alternatively appear in the *Vorfeld*, in which case it must by definition occur before everything in the *Mittelfeld*. Yet ‘*Mittelfeld*’ does not correspond to a node or a subtree in a traditional phrase structure tree. These orderings, furthermore, are purely an issue of intraclausal scrambling among the base-generated constituents of the clause in question—not unbounded dependencies derived through movement.

3.2. EXAMPLE 2: THE GERMAN LEFT SATZKLAMMER. The position of the left *Satzklammer* itself is another such example. In many analyses, this position can be filled by a variety of different traditional constituent categories, including finite verbs and auxiliaries, complementisers and subordinating conjunctions. They occur after the *Vorfeld*, and thus form a ‘second position,’ which, as in the case of many FWO languages, must be treated rather specially since the ‘first position’ does not always contain a complete

<i>u lepi grad</i> in beautiful city	<i>je</i> CL-3s		<i>Ivan stigao</i> Ivan arrived
PP	2nd		

Figure 3. Clitic placement after a full syntactic phrase (2D).

<i>u lepi</i> in beautiful city	<i>je</i> CL-3s	<i>grad</i> city	<i>Ivan stigao</i> Ivan arrived
prosodic word	2nd	remainder	

Figure 4. Clitic placement after a prosodic word (2w).

phrasal projection. In German, this mismatch generally arises with instances of partial verb phrase fronting (Kathol 2000). The < operator cannot encode the LP constraint, ‘second’ without granting some kind of constituency status to whatever occurs first.

3.3. EXAMPLE 3: SERBO-CROATIAN¹ SECOND-POSITION CLITICS. The problem of the constituency status of first and second positions is even more acute in Serbo-Croatian, a language in which the realisation of NPs is generally quite a bit freer than in German. Here, there is a class of pronominal and auxiliary forms that are prosodically enclitic to the topic position and likewise form a ‘second position.’ In the case of Serbo-Croatian, the first position can either be a full NP or PP projection (2D), as in Figure 3, or a prosodic word (2w), as in Figure 4 (Browne 1974).

Most Serbo-Croatian prepositions, including *u*, are prosodic proclitics to the first word of their objects, so *u lepi* is a prosodic word even though it does not form a traditional syntactic sub-constituent.

There is, in fact, a long and rather embarrassing series of attempts to analyse these linear distributions in purely syntactic or purely prosodic terms, as discussed in Penn 1999². Now, there appears to be a general agreement that both levels of representation are necessary, although there is still no apparent consensus on how to combine them.

When more than one second-position clitic occurs in a single clause, they occur in a cluster with a fixed order among them (Browne 1974).

4. RELATED WORK. The parsing model formulated here gives first-class status to a linear topology for defining word-order and contiguity. This is, of course, not necessarily the five-field topology defined for German clauses, and must be declared in a manner similar to the declaration of phrase structure rules in a context-free grammar. This kind of ‘linear constituency’ co-exists with the more traditional constituency that guides the assemblage of an interpretation of a sentence through the assignment of thematic roles, grammatical function and (abstract) case, syntactic constraints on the resolution of scope ambiguities, etc.

The dual-constituent nature of this model is inspired by the proposal by Curry (1961) to separate constituency into two kinds: *tectogrammatical* constituency, which

guides interpretation, and *phenogrammatical* constituency, in which the role of inflectional morphology and the different behaviour of fixed and free word-order languages is expected to be captured. This initial proposal has also had a very strong influence on work in the later Prague school, as well as that of Dowty (1996) and Kathol (2000), although all of them define this distinction in slightly different ways. The present proposal is again slightly different from these.

The present approach also departs from Kathol (2000) in viewing topological fields as nested within a *region* whose internal word-order is characterised by such a topology. A region can, in turn, be nested inside a field. German embedded clauses, for example, have internally defined topologies, as all German clauses do, but occur themselves within the *Nachfeld* of a higher clause. In principle, the topology within a region need not be the same as the topology within which it is embedded. Noun phrases, for example, do not have the same five fields as clauses in German, but they can occur in the *Vorfeld* or *Mittelfeld* of a clause.

The distinction between constituent structure (C-structure) and functional structure (F-structure) in Lexical-Functional Grammar (Kaplan & Bresnan 1982), in the author's view, has essentially the same motivation. C-structure, the nearest correlate of phenogrammatical constituency, is not intended to guide the assemblage of an interpretation, but still uses tectogrammatical constituents in its rules (and, in fact, still has only one kind of constituent). When dealing with freer word-order languages, C-structure rules must then be numerous and have many daughters in order to capture sufficiently many tectogrammatical categories within a single rule to enumerate all of their possible permutations. As a result, C-structure trees look very flat and rather arbitrary, given that what are essentially phenogrammatical regions are still labelled at their root by tectogrammatical categories.

One could also cite the work of Duchier and Debusmann (2001) in comparison with the present approach. They use topological fields in a dependency grammar, where they are used to resolve the order of dependents within the domain of governing nodes. Although Duchier and Debusmann (2001) generalise topological fields to handle the internal order of noun phrases, rather than just clauses, governors are the only approximation to the regions used here. In a great many FWO languages, however, including German and Serbo-Croatian, regions are not always identical to the arguments of a single syntactic head. A few *ad hoc* devices are introduced for the purpose of handling the exceptions that arise in the authors' implementation of a German grammar. Nevertheless, the result of these repairs yields a dependency tree as the only (tectogrammatical) guide to assembling an interpretation. Other work on dependency grammar within FWO languages, notably that of Hajičová, Sgall and others on Czech, has extensively documented the shortcomings of a single surface-oriented dependency tree in assembling a sufficiently rich semantic interpretation. They typically use transformations on dependency trees to create a *tectogrammatical* dependency tree. Here, tectogrammatical structure is formalised with the retention of phrasal projections.

The present work also bears a resemblance to Autolexical Syntax (Sadock 1991) in that parallel but mutually constrained structural derivations are being posited. In fact,

although prosodic words are currently identified as phenogrammatical regions in the present approach, there should be a third parallel structure for prosody, and possibly even a fourth for discourse-linked regions that are structurally constrained in the same way. This has not been fully developed yet, only because of the author's own ignorance of how prosodic and discourse structure should be represented.

5. TOPOLOGICAL PARSING MODEL. We can thus distinguish three kinds of constituent primitives:

PHENOGRAMMATICAL:

1. fields, e.g., the German *Mittelfeld*, a Serbo-Croatian *clitic field* and *pre-clitic field*, etc.;
2. regions, e.g., German clauses and noun phrase regions (whose internal topologies differ from those of clauses), Serbo-Croatian clitic regions (within which the fixed order of clitic clusters is defined), prosodic word regions, which, in 2w position, occupy the pre-clitic field, etc.; and

TECTOGRAMMATICAL:

3. categories, either atomic ones, or more complicated categories such as typed feature structures (Pollard & Sag 1994).

The lexicon assigns one or more category and one or more field or region to every word.

5.1. TOPOLOGICAL RULES. We can then state two kinds of rules, one phenogrammatical and one tectogrammatical, that tell us how to assign these primitives to larger substrings. The phenogrammatical, or topological rules are essentially context-free rules over fields and regions. Each has one of two possible forms:

- $f \rightarrow r$, which indicates that a particular field, f , can contain region, r ; and
- $r \rightarrow d_1 d_2 \dots d_n$, which indicates that region, r , has a topology defined by the *field descriptors* d_1 through d_n . Each field descriptor is one of:
 - f , exactly one occurrence of the topological field, f
 - $\{f\}$, zero or one occurrence of field, f
 - f^* , zero or more occurrences of field, f , or
 - f^+ , one or more occurrences of field, f .

As examples of the former, we find in German:

$nf \rightarrow \text{clause}$

German embedded clauses occur in the *Nachfeld* in the next higher clause. As an example of the latter, we again find in German:

$\text{matrix} \rightarrow vf, cf, mf^*, \{vc\}, \{nf\}$

We can assume the existence of a distinguished single field/region, matrix, which corresponds exactly to entire sentences, and is not contained in any other field or region. Here it is assumed that these correspond to matrix clauses, which consist of the five standard fields. Note that the right *Satzklammer* (vc, for verbal complex), and *Nachfeld* (nf) are optional, and any number of regions may occur between the left *Satzklammer* (cf, for complementiser field) and right *Satzklammer*, provided that they can bear the field assignment, mf (*Mittelfeld*).

5.2. INTERPRETATION RULES. The tectogrammatical, or interpretation rules are like traditional phrase structure rules over traditional, tectogrammatical categories, but without any assumptions about linear precedence or contiguity built in. Where they exist, these are explicitly specified as attachments to the rule:

$$\text{cat}_0 \Rightarrow \text{cat}_1 \text{ cat}_2 \dots \text{cat}_n; \phi$$

where ϕ consists of:

- $i < j$ (linear precedence)
- $i < < j$ (immediate precedence)
- $i \text{ compacts}$ (contiguity)

closed under conjunction, for some collection of pairs $1 \leq i, j \leq n$.

As an example, we can consider two interpretation rules that encode a simplified case of PP dislocation in German, in which a PP modifying a noun occurs either immediately after the noun, or in the *Nachfeld* of the clause in which the noun occurs:

$$NP \Rightarrow NP \text{ PP}; 1 < 2$$

$$NP \Rightarrow NP \text{ PP}; 2 \text{ matches } nf$$

5.3. SYNCHRONISATION CONSTRAINTS. Topological rules relate the phenogrammatical primitives to each other, and interpretation rules relate the tectogrammatical primitives to each other. Mediation of constraints between phenogrammar and tectogrammar are handled by synchronisation constraints. These constraints specify the circumstances under which an instance of a field or region corresponds to the same string that some category corresponds to:

- $(\forall) f/r \text{ matched_by } (\exists) \text{ cat}$
- $(\forall) f/r \text{ covered_by } (\exists) \text{ cat}$
- $(\forall) \text{ cat matches } (\exists) f/r$
- $(\forall) \text{ cat covers } (\exists) f/r$
- $(\forall) \text{ cat compacts}$

Constraints with 'covers' or 'covered_by' indicate that the field's/region's string is a substring, not necessarily an exact match.

The left-hand-side of each constraint is implicitly universally quantified, and the right-hand-side is implicitly existentially quantified. For example, the first says that *every* string corresponding to an f/r also corresponds to *some* cat. Because of this asymmetry, we also need constraints in which the tectogrammatical category appears on the left—these are the third and fourth forms. The fifth is simply a universally quantified form of the contiguity constraint found in the interpretation rules. It would also be possible to add universally quantified linear precedence statements, although these seem to be adequately handled by topological fields.

As an example, noun phrase regions, the phenogrammatical primitives over which the linear order of noun phrases is stated, are only related to NPs by covering, not matching:

npr covered_by np

The reason for this is that relative clauses or PPs which, tectogrammatically, are part of the NP and its interpretation, may be linearly dislocated to the *Nachfeld* of the containing clause, and thus become subject to the clausal topological ordering.

6. PERFORMANCE. A prototype of a parser based on this model, with grammars for both German and Serbo-Croatian, has been implemented by Mohammad Haji-Abdolhosseini of the University of Toronto Linguistics Department. The implementation is written in SICStus Prolog, and compiles grammars provided by a user in the above form into SICStus Prolog code, which is then further compiled by the SICStus compiler itself. It currently supports only atomic categories, although an extension of this to typed feature structures is planned.

The parser proceeds by first looking up the parts of speech of an input sentence, and then associating these through the structural constraints provided by the grammar, with phenogrammatical fields and/or regions. A phenogrammatical tree is then built in a bottom-up fashion with a standard context-free parsing algorithm. As fields or regions are encountered that are structurally constrained by tectogrammatical categories, those categories are predicted to exist, with their structures generated from the tectogrammatical rules in a top-down fashion. If they can eventually be linked to the lexical parts of speech, then the prediction is certified as having been derived. In this way, both trees are constructed. Other parsing algorithms could be devised.

The performance of the compiled code by this implementation on 10–15 word German sentences is slightly less than 200 ms on average. Its performance on 5–10 word Serbo-Croatian sentences is about 150 ms on average. While this is not quite fast enough for real-world applications, it is promising, particularly in light of the number of compile-time optimisations that could be performed on such grammars to exploit the constraints on linear precedence that they do exhibit. Currently, no optimisations are being applied.

7. FUTURE WORK. A great deal of work remains to be done on this topological parsing model. Of foremost importance for linguistic application is the development of larger experimental grammars, and alternative parsing strategies to improve our understanding of the kinds of constraints that are exhibited in practice in FWO languages. In terms of scaling up to coverage of very large corpora, e.g., newspaper text, the most important issue is discovering the right numerical parametrisation of this model, along with statistical estimators for those parameters, which can be used to select the 'best', i.e., most probable parse. The current parsing method finds all possible parses, which, although obviously useful for grammar development and testing, can never be as fast on a large-scale because of the sheer number of constructions that must be licensed in such grammars.

As mentioned above, a more mature account of prosody and discourse structure must be devised to be incorporated into this model, and further compiler optimisations must also be implemented. It will also be necessary to allow grammar writers to state their rules in the form of phrase structure rules, and the more traditional idioms of syntactic theory, where enough linear precedence and contiguity does exist to justify them.

It should also be noted that no attempt is made here to deal with unbounded dependencies. It is recognised that these are a very different issue from the intra-clausal scrambling that characterises FWO languages, and some account needs to be incorporated into the model. In the author's opinion, a sufficiently rich category system, such as typed feature structures, would be enough to handle these without any modification external to that category system, but there is some evidence to suggest that unbounded dependencies involve 'movement' of phenogrammatical constituents rather than tectogrammatical ones (Penn 1999). This requires further investigation.

¹ Although German and Serbo-Croatian were chosen for independent reasons, it was brought to the present author's attention during the conference that there has been an earlier comparative study of linear precedence in these two languages, with the aim of demonstrating that Slovene is a South Slavic language in transition to a more Germanic-style verb-second word-order (Bennett 1987). It would be very interesting indeed to cast this transition into the terms of the model proposed in this paper by formulating a grammar for Slovene with it.

² The notable exceptions to this are Halpern (1995) and Schuetze (1996), who both try to combine syntactic and prosodic influences into a single account.

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MODAL AND ARGUMENTATIVE FEATURES OF PARLIAMENTARY DEBATES ON INTERNATIONAL TERRORISM: A CASE STUDY

VLADIMIR LAZAREV & LIUDMILA PRAVIKOVA
Pyatigorsk State Linguistic University, Russia

'The paradox of tolerance'... states that in a free society we must tolerate all but the intolerant, because if we tolerate the intolerant the conditions for toleration disappear and the tolerant go with them.

Sir Karl Popper, *The Open Society and its Enemies*

LANGUAGE IS VITAL FOR THE MAINTENANCE of social order, and the interaction model of discourse analysis necessitates the address to the aspects of cultural and ideological assumptions and wider background of social interface. Discourse is a form of social action, and political discourse is an extensive sphere of human communication, business performed entirely by language. All the texts of political discourse exercise powerful influence on the norms of life of the society, forming attitudes and beliefs in a well-directed effort of political management of citizens. Political discourse shapes public opinion on pivotal issues of societal functioning.

The discourse of parliamentary debates presents a complicated mixture of political institutional practices of joint discursive activity aimed at decision-making through convincing, persuading and reaching consensus in the on-going negotiation process. The discourse of parliamentary debates on terrorism involves material of extreme social value, united by common content and argumentative structure. It lies at the interface of discourse, society and personality and is analyzed within several research paradigms. The theoretical basis for research is multidisciplinary: critical discourse analysis (Van Dijk 2001), argumentation theory (Ducrot 1996) and modality theory (Coates 1987).

The *aim* is to suggest how several prominent characteristics of this discourse—namely, axiological, epistemic, deontic and logical conceptualizing—outline the overall structure of the text, to highlight its themes and to enhance the effectiveness of pragmatic functions.

1. THE THEORETICAL FRAMEWORK FOR THE ANALYSIS OF PARLIAMENTARY DEBATES ON TERRORISM. The object of the study is the transcript of the sitting of the British Parliament of September 14, 2001 (the Hansard records: 39,023 words, 5 hours in duration). This choice is not random. It was made for a number of reasons. Firstly, the debate of September 14 occupies a salient place in the system of parliamentary debates, as it shows the first reaction of the British Parliament to the extraordinary events of September 11, 2001. Secondly, with regard to content and form, parliamentary debates

on terrorism differ from standard debates. Hence, it is important to show the place of parliamentary debates on terrorism in the system of standard parliamentary debates.

From the content point of view, most standard parliamentary debates, as a rule, are concerned with issues of economic, social-political, military and other problems tied with societal interests. In standard parliamentary debates representatives of different parties expose interests of their electorate, advance motions and legislative acts, trying to convince other members of parliament of the necessity of adopting their policy. Opposition formulates the content of debates, their specific argumentative structure, their special aims and tasks. The party that brings more valid arguments in favor of its project, pushes its proposal on the basis of majority selection.

In parliamentary debates on terrorism a different system of interests and values is discussed in specific communicative conditions, when the antagonist is absent. Nevertheless, his standpoints and behavior are the object of debate. Members of parliament discuss not narrow party interests but all human interests vital for the populations of many countries. The dividing line is between the Open Society and closed societies. International terrorism is a form of ideology that conflicts with the ideology of civilized countries (Open Society) and affects the interests of the majority of mankind.

In standard parliamentary debates the issues are discussed by the parties that express various interests, and this opposition is their distinctive feature. In the debates under discussion the antagonist is absent, but the opposition of ideologies remains. On the one hand is the ideology of all human values; on the other, the ideology of international terrorists. The debates are between parliamentary members and an absent interlocutor who does not participate in verbal debates, because he uses not the parliamentary language, but the language of terror acts.

Thus, the specific features of parliamentary debates on international terrorism, which took place on September 14, 2001, are determined by the fact that they were not carried out in an atmosphere of opposition between parliamentary groups. On the contrary, parliament unanimously stood against Islamic fundamentalists in a common front: 'Today we have set partisan politics aside. In the face of great evil, we are one Parliament and one House.' The parliamentary debates on international terrorism, above all, reflected the evaluation of the events of September 11, condemnation of terrorists, understanding the events not as a private act of terrorism but as a challenge to the whole civilized world, a challenge to freedom and democracy. The most important fact is that parliamentary debates on international terrorism express the interests of the absolute majority of people of the United Kingdom and objectively coincide with the international interests of all civilized countries of the world.

Standard parliamentary debates and debates on terrorism differ not only in their content, but also in the form of language used in this context. Any parliamentary debates, both standard and the analyzed debates on terrorism, contain *evaluative*, *emotive* and *epistemic* components, *action prescriptive* and *formal-logical* components. The evaluative component of argumentation contains positive and negative assessments of events, activities, processes, participants and phenomena of reality within the frameworks of aesthetic, ethic and pragmatic standpoints of people. The

epistemic component of argumentation is connected with degrees of knowledge, and it includes the gradation of certainty against uncertainty, conviction against disbelief, assertion against hesitation, and confidence against doubt in the truth or acceptability of assessments and decisions made. The part of argumentation prescribing action, the deontic module, in other words, includes the substantiation of aims setting, tasks for aims achievement, and the means and manner of their realization in the sociophysical sphere. It is pragmatically oriented for expression of different social attitudes, such as necessity, obligation and permission. All content oriented components of argumentation are characterized by their language profile. The formal component includes thesis/antithesis, arguments/counterarguments and conclusions/counterconclusions.

From a linguistic point of view, standard and non-standard parliamentary debates, as stated, have the same means of expression for evaluating the situation, its explaining it, justifying and reaching a conclusion, and deciding what action to take. However, these means have different realization in the two types of debates. In standard parliamentary debates, because antagonists holding opposed interests and standpoints on the issues are present, the parliamentary discourse acquires a more apprehensive, rigorous and compelling argumentative character. A striking role is played by support, justification or evidence for the truth of the claims, statements, concerning the content of programs, motions, etc. Hence the explicit use of causal and consecutive conjunctions in the text. These conjunctions are typical of strong contexts that require the justification of the initial thesis. Consequently, the intensifying expressions *only because*, *just because*, *merely because*, and *simply because* appear. The consecutive conjunctions *therefore*, *consequently*, *so*, and *thus* are used, and this highlights the significance of conclusions in the context of opposing interests among parliamentary members. The evaluative and emotive expressions of modality appear to a lesser degree; less importance is attached to other means of expressing modality.

The opposite is the case with the use of these means in the analyzed debates on international terrorism, which fill a specific niche owing to the collaborative tactics employed. The unanimity of viewpoints expressed and the absence of an antagonist, results in the dominance of evaluative, emotive and modal means of assessing the situation. The claims expressed do not need special substantiation, because their intelligibility is obvious to all civilized people. That is why in the parliamentary debate on terrorism the markers of argumentation (premise and conclusion indicators) rarely occur in the form of causal or consecutive conjunctions and in combination with focal intensifiers. They are used in their additive function. Moreover, cause-effect and other linear relationships that function to substantiate claims are fixed not with the help of causal conjunctions, but in asyndetic forms. Hence this kind of argumentative discourse can be regarded as a conversational type, with logico-semantic relationships expressed implicitly on the content level and not by causal conjunctions.

In standard parliamentary debates argumentation supports claims, and the force of argumentation determines the character of decision-making, successful or unsuccessful resolutions and voting. In the parliamentary debates on terrorism argumentation

is implicit, not oriented toward the verification of claims. In this case argumentation is used to support decisions for an accepted course of action.

Taking into consideration the above, we turn to a description of the language and argumentative features of parliamentary debates.

2. MODAL DIMENSIONS OF TEXTS OF PARLIAMENTARY DEBATES ON TERRORISM. The importance of studying modal dimensions is determined by the fact that modality, as a sentence modifier, reflects an attitude towards the state of affairs, the way a speaker perceives the world, and as a structured way of speaking, that underlies all the utterances (Ruthhof 1991). From a broad perspective, modality is the general attitude of the speaker towards the content of what he says. It expresses a gradient link between the message area and reality, semantically being a subjective evaluation of the propositional content of the sentence uttered (Palmer 1990). From the cognitive point of view, modal predicates open an embedded modal space within the truth domain or basic reality (Fauconnier 1985, Sanders & Spooren 1996). Modality of parliamentary debates on terrorism expresses attitude in *axiological/evaluative* and *action prescriptive* terms.

2.1. AXIOLOGICAL FEATURES OF THE DEBATES. In the narration and argumentation of the parliamentary debates, the axiological evaluative language provides a mechanism for encouraging the audience to view the situation through the speaker's eyes and to thereby support his value judgments. Evaluations express biased attitudes. Active information processing includes formulating arguments on the basis of evaluating biased language, which is a necessary condition for attitude change and the transformation of consciousness into action.

The speeches of members of Parliament are filled with assessments of the events of September 11. These assessments can be divided into negative ones that condemn the atrocities of terrorists and positive ones that express admiration for the people of the USA, sincere condolences and other positive feelings. The 'we'/'they' distinction comes into focus. The most prominent feature of evaluative language in the parliamentary debates analyzed is the polar distribution of lexico-semantic means into two parts—evaluations of 'us' and evaluations of 'them', i.e. tools that constitute polar systems of information territories, that underlie the divergence of values between the Open Society ('we') and the closed societies that breed terrorism ('they').

Table 1 indicates the distribution of the lexicon according to the distinction 'we'/'they', so far as the basic values, features, actors, actions, effects and illocutionary targets are concerned.

The debate text is full of emotional evaluations, presenting the descriptions of a) 'our' states (*our cherished freedom and democracy, our genuine and heartfelt sympathy, selfless bravery, unflinching sense of duty, clear and unequivocal intelligence*); and b) condemnations of 'them' (*terrible and sickening series of atrocities, dreadful event, terrible, meaningless atrocity, appalling tragedies, dreadful act of terrorism, grotesque acts, abhorrent madness, awful aggregate figures, vicious crime, callous and brutal ferocity, barbaric and inhumane terrorist atrocity, cowardly acts of evil*).

We	They
values	
the basic democratic values, democracy and the rule of law, freedom, humanity, civilised world, reason	no civilized values, no democracy, no freedom
features	
great resources of character, our resolve to defeat, tolerance, dedication, deliberation, courage, calm determination and dignity	barbarism, evilness, loss of humanity, contempt for human life, threat to freedom and democracy, fanaticism
actors	
guardians of a set of values that are underpinned by that democracy and the rule of law, friends and allies, heart-broken families, vast majority of decent people, victims	enemy, perpetrators, suicidal fanatics, fanatics killing, people perpetrating, terrorist
action	
support for action, unflinching support, solidarity, defence of freedom and democracy, strong condemnation of the atrocities, united condemnation, , universal condemnation, one common endeavour	murder, terrorism, atrocities, onslaught, organised crime, terror acts of terrorism, crime against humanity, attacks on the basic democratic values, act of wickedness, act of war, violent ending of life, deliberate act of war
estimations of the facts and effects	
emotions of shock, sorrow and anger, expression of unity, our shock at this terrorism, proper sentiments, deep sorrow, collective sorrow, unbearable anguish left behind, sense of horror and frustration	catastrophe on this scale, massive tragedy, plight, disaster, shock, calamity, intense agony, corrosive effect, devastating effect

Table 1. ‘We’/‘they’ distinction.

To show the emotions of the civilized world, many verbal combinations are employed: *grieve the loss of a loved one, express our admiration, mourn the dead, send our heartfelt condolences, be frustrated, share the sense of shock and outrage, praise, welcome and support, regret, send our condolences.*

The significant part of the parliamentary debates on terrorism is devoted to the prescriptive actions of the civilized world. There is a substantial part of verbal semantics, used to determine the action to combat terrorism: *bring to account, to justice,*

act to protect the living, take all necessary steps to combat terrorism, take determined collective action against the threat, hunt down and hold to account the terrorists, root out this cancer of terrorism from the world, fight the menace of fundamentalist Islamic terrorism, destroy machinery of terror, defuse tensions and to work for peace, resolve conflicts, act out of a sense of justice, rise up against the perpetrators.

To show different ways of achieving the aim, parliamentary speakers use the following expressions: *not strike first and think afterwards, understand the nature of this enemy, never lose sight of our basic values, hold essentially liberal values, have respect for human life, bring some good out of this evil, ensure the triumph of the civilized values, make intelligent decisions, channel the rage and revulsion, be cautious.*

Solidarity at the lexico-semantic level is expressed by such verbal phrases, as *be united in the House in our determination, make common cause with us in defeating this barbarism, stand together, stand by the people, affirm once again our solidarity and our unity of purpose, be fully in agreement on the points, unite, find ourselves in complete solidarity, offer them our full backing, form a worldwide coalition, show solidarity, internationalize and co-ordinate a calm response, help, be single-mindedly addressed to the need to bring these people to justice.*

2.2. MODAL COMPONENT. In the parliamentary debates on international terrorism the dual function of the discourse is qualification of the speakers' beliefs (epistemic modality) and behavioral regulation (deontic modality). Epistemic modality is interwoven with deontic modality, for the means of expression of epistemic modality are directed at achieving deontic goals.

2.2.1. EPISTEMIC MODALITY. Epistemic modality is expressed by epistemic adverbs (*perhaps, of course, maybe, probably, surely, possibly*), epistemic verbs and verbal expressions/mental state predicates (*know, be sure, believe, think, suppose, presume, seem, guess, consider, conjecture, suggest, suspect*), modal auxiliaries (*must, may*), verbs of assurance (*assert, ensure*), word combinations (*to my mind, in my opinion*) and the forms of representation of subjunctive mood. The generalized character of negative assessment of international terrorism, the unanimous back up of the system of values of the civilized world call for the use of the strong register of epistemic modality, represented mostly by epistemic adverbs and epistemic verbs.

2.2.1.1. EPISTEMIC ADVERBS. The analysis of the parliamentary debate on terrorism showed that of all the epistemic adverbs—weak (*perhaps, maybe, possibly*), medium (*probably, presumably, likely*) and strong (*of course, surely, certainly, apparently, obviously, evidently, definitely*)—strong epistemic adverbs are used in 70%, and weak epistemic adverbs are used in about 30%. The strong epistemic adverbs provide the highest degree of assurance that members of Parliament are convinced of the truth of the claims expressed and in the evaluations of terrorism, as well as the values of the civilized world. Epistemic adverbs initiate the expression of prescriptive actions in conclusions.

- (1) The Prime Minister: *Of course*, we as a country **will** always **act** in accordance with the beliefs that we hold dear.

The epistemic adverbs *obviously* (2) and *certainly* (3) form a territory of evidentiality and confidence in the parliamentary text:

- (2) Many points of leverage can be used on both the Israelis and the Palestinians but, *obviously*, we **need** to start a new process on firm foundations.
- (3) Like many Members, I have been through America on internal flights. *Yes*, it is **certainly true** that security there is perhaps not what it should be, but let us not be deluded that we may not face similar problems of vigilance in this country as our internal flight schedules come more and more to resemble those of the United States, as more and more people travel.

2.2.1.2. EPISTEMIC VERBS. The character of the epistemic verbs and verbal expressions used is an important indicator of manifestation of situation evaluations and prescriptive actions. The verbs and verbal expressions with epistemic meaning are mental predicates *know, be sure, believe, think, suppose, presume, seem, guess, consider, conjecture, suggest, suspect*; the expressions *to my mind, in my opinion*, and the verbs of assurance *assure, ensure*. In the discourse analyzed, as a rule, *believe, think, consider*, and *assure* prevail over other epistemic verbs that communicate personal, subjective points of view.

The verb *believe* is one of the key verbs that 1) expresses the highest degree of a speaker's confidence in the information communicated, 2) is the subjective means of expressing prescriptive modality proved by the use of expression *we believe* as well as the combination *I believe* (4), (5). The verb *believe* in this context is a marker of strong belief, even certainty and assurance in the truth of the values of the civilized world. It is possible to correlate the meaning of this verb with the meaning of epistemic adverbial *of course*.

- (4) From the catastrophe, *I believe* that the United States and the free world **will emerge** stronger.
- (5) It is a difficult time, but *I believe* that it **is the right time to examine** more deeply our role and responsibilities in the world.

Epistemic expressions expose the relation of the speaker to reality and the degree of responsibility taken for proposition content on the scale from certainty to doubt (Coates 1983). Different cognitive styles are connected with different modality features: personal pronouns, personal evaluations and attitudes, different types of cognitive processes, adverbs of opinion, judgment, and relationship. Evaluative expressions reflect personal attitudes to reality.

2.2.2. ACTION PRESCRIPTIVE MODALITY OF PARLIAMENTARY DEBATES. Deontic, or prescriptive modality is expressed straightforwardly through verbs. Tony Blair, the Prime Minister and members of Parliament offered a wide program of actions in the fight against international terrorism and in maintaining the foundational values of Western civilization, such as freedom and democracy. The confidence in the need to take such actions is communicated by modal verbs and expressions (*must, it must be, there must be, should, we have to, we will, can, could, need, etc.*) and action verbs (*agree, support, etc.*).

2.2.2.1. MODAL VERBS AND EXPRESSIONS. The mainstream prescriptive modality is formed by such verbs as *can, must, need, could, should, will, have to, cannot*. The use of modal verbs in the speeches of the Prime Minister and members of Parliament is a sign of full solidarity in their evaluation of the events of September 11, 2001, and to the suggested solutions in connection with these events. The verbs *must*, especially in the combinations *we must, it must be, there must be, need, should, have to, will* in the context of the parliamentary debate express the meaning of obligatory solidarity in conclusions of argumentation. An important place is taken by the verbs *can, could, etc.*, that are used to demonstrate the ability of civilized nations to fight terrorism. The verbs *may* and *might* in their epistemic meaning are rarely used. The verb *ought* expresses weak epistemic meaning.

- (6) We no longer have fortress America or fortress Europe. We **must** deal with this as an international community. We **must** bring in the Russians, with whom, ironically, we now have common cause in facing a common foe. We **must** share intelligence and...
- (7) We **need** a second line of defense, do we not? We **need** effective border controls of our own... Thirdly, we **need** to know that those who are in our country are people with whom we can feel at ease and who pose no security threat to us.
- (8) I say that murder is murder in any culture. Torture is torture in any language. We have an opportunity to bring terrorists and the regimes that harbour them to account, and we **should** take that chance.
- (9) We have many different ideas, but we are all united in a consistent belief that we **have to** use the democracy that we enjoy here to further the opportunities for other countries to share in our values and traditions.

2.2.2.2. ACTION VERBS WITH THE MEANING OF AGREEMENT, SUPPORT, READINESS TO OFFER HELP. As seen in the text of the parliamentary debates, these are the verbs and verbal expressions: *agree, ensure, welcome, support, praise, offer, express support, condolence, gratitude, will* and others. For example:

- (10) We must **ensure** that our tolerance, our freedom and our liberal democracy are not abused and used against us.
- (11) We have all been touched by this dreadful event. ... I **welcome** and **support** the Government's swift announcement that, at this time of America's need, we shall do so again. I also **praise** the way in which the Prime Minister indicated that, in the difficult and dangerous times ahead, we will **support** our friends.
- (12) When we have needed America, it has helped us. When America needs our help, we **will** help it.
- (13) **I agree** that we need more international action at the highest levels--international co-operation in intelligence and extradition to fight the common enemy, terrorism... Secondly, **I agree** with those who suggest that there has never been a better time to deal with the underlying causes of world terrorism--the hot spots that in their lack of resolution have bred the refugee camps fuelled with a sense of injustice and hatred.

3. FORMAL MEANS OF ARGUMENTATION. Formal structural parts of argumentation are *thesis/antithesis* and *argument/counterargument*, which form premises, warrants, backing for claims, and *conclusion/counterconclusion*.

3.1. PREMISES, WARRANTS AND BACKING FOR CLAIMS. The particular thing in argumentation in the parliamentary debates on terrorism is that arguments are directed not at the substantiating the truth of the claim, but at the support of prescriptive, deontic conclusions formulated as decisions offered to ensure the course of action. The second feature of the means of expression of argumentation is that argumentation markers are omitted in many cases and realize their functional semantics implicitly. In comparatively rare cases they are expressed explicitly. Here are the examples of implicit use of claim substantiation.

- (14) We know a good deal about many of these terror groups. But as a world we have not been effective at dealing with them. **Of course**, it is difficult. We are democratic. They are not. We have respect for human life. They do not. We hold essentially liberal values. They do not. As we look into these issues it is important that we never lose sight of our basic values. But we have to understand the nature of this enemy and act accordingly...

In this passage the claim is represented by the sentence 'Of course, it is difficult' that is supported by three arguments: 1) 'We are democratic. They are not'; 2) 'We have respect for human life. They do not'; 3) 'We hold essentially liberal values. They do not'.

Any of these arguments in the deep semantic structure contains an omitted causal conjunction *because* that connects the claim and the premise.

The formal means of expressing premises are the lexemes *because*, *for*, *since*, *as*, which are rarely used (see [14]). However, they sometimes appear, as in (15) and (16).

- (15) If all that sounds draconian, it is ***precisely because*** those are the measures that open societies have to take when they are under attack.
- (16) We must banish the causes of hate, ***for*** ultimately it was hate, and nothing but hate, that caused the crimes on Tuesday—murderous, anti-American hatred in the hearts of the perpetrators.

3.2. LOGICAL MEANS OF INFERENCE AND CONCLUSION. The logical means of signaling inference or conclusion are the lexemes *therefore*, *thus*, *hence*, *so*, *as a result* and *consequently*. Except as premise markers, they are rarely realized. The prototypical conjunction *therefore* is a consecutive element of conclusion in the structure of the simple syllogism in formal logic. The use of this consecutive is, in our opinion, the expression of the truth of the arguments and the means of setting off the decision offered. Here are examples:

- (17) Terrorists operate without regard for borders. The fight against terrorism ***therefore needs*** to be a global one.
- (18) May I also underline and agree with the Leader of the Opposition's comments, in which he pointed out that we have seen the worst act of terrorism inflicted on the British people since the last war? It is quite ***right, therefore*** that, along with our allies, we should seriously contemplate what the appropriate action is.

The conjunction *therefore* may be compared with the epistemic adverb *of course* and the epistemic verb *believe* in degree of assurance.

Thus, the premise and conclusion markers in argumentation are directed at formulating support for decisions; namely, they are used as logical-semantic means of prescriptive modality.

4. CONCLUSION. Parliamentary debates belong to the genre of political discourse, sharing with it common rhetorical and linguistic features. Their aim is to convince the audience of a certain state of affairs, give different sets of evaluations, points of view or of some risks evoked by doing or not doing something that is connected with political, social or economic advantages for the country.

From the argumentation perspective, parliamentary debates, as a whole, may be divided into standard and non-standard, which differ in content and form. In standard parliamentary debates political, economic, military and other issues are

discussed, and decisions are initiated by separate parties and connected with their interests. In non-standard parliamentary debates on terrorism the focus is on all the human values that oppose the ideology of terrorism, and parliamentary members fulfill both their institutional roles as party representatives and non-institutional roles as ordinary people.

The standard parliamentary debate and parliamentary debates on terrorism are radically different. The difference is that the latter take place in the absence of an opponent. Thus, strictly speaking, they are not debates proper, as debates take place between opposing parties present in the house. The absence of the opponent determines the particularities of the use of modal argumentation in debates on terrorism. In standard debates argumentation is aimed directly at substantiating claims and obliquely at supporting the decisions offered. In the parliamentary debates on terrorism the truth of claims need not be substantiated because of their transparent character, but they are evaluated according to their moral qualities. That is why argumentation is aimed at substantiating the decisions offered, at working out the common course of the fight against international terrorism.

The text analyzed opens a new domain in forming the ideology of democracy, humanity, reason and tolerance in the civilized world. The ideology and language of tolerance mirror the values of the civilized world. They are represented by lexis with positive values. In approaches to diverse beliefs the language of tolerance uses soft, not hard argumentation, leaving space for compromise and consensus. The ultimate goal of the language of tolerance is the achievement of mutual understanding and co-existence. The language of tolerance is now starting to react to the language of terrorism. It is becoming the means of protecting of the values of civilization through the language of persuasion and action.

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DISTRIBUTIONAL PROPERTIES OF GERMAN VERBS WITH INSEPARABLE PREFIXES: IMPLICATIONS FOR MORPHOLOGICAL PROCESSING

MATTHIAS K. SCHIRMEIER

Department of Linguistics, University of Alberta

TO DATE, THERE IS STILL NO CONSENSUS as to how speakers of various languages recognize simple and complex words. Does the processing of a morphologically simple item such as *keep* differ from that of a morphologically complex one such as *disappear*? Whereas it is reasonable to assume that the word recognition system treats simple words such as *keep* only as whole units, one can identify at least two different ways of potentially processing morphologically complex words such as *disappear*, namely, whole-word and constituent-based processing. Whole-word processing would imply a lack of distinction between the treatment of morphologically simple and complex words; in the present case the processing units would be [keep] and [disappear], respectively. As far as constituent-based processing is concerned, the respective processing units would be [keep] and [[dis] [appear]]. The notion of constituent-based processing for polymorphic words, therefore, implies the existence of a more diverse organization of the repository of words in the mind, i.e. the mental lexicon.

1. WORD RECOGNITION AND THE MENTAL LEXICON. Investigating the potential organization of the mental lexicon has been at the core of psycholinguistic research for more than 25 years. Figure 1 (overleaf) illustrates a schematic account of word recognition and the mental lexicon which is compatible with most of the models suggested in the literature. First, there is a distinction between oral stimuli (i.e. a sequence of speech sounds) and visual stimuli (i.e. a sequence of letters). Each type of stimulus is then considered to function as input for modality-specific access representations of the mental lexicon: oral stimuli are checked against phonological representations, whereas visual stimuli are checked against orthographic representations. If the incoming stimuli match any of the stored phonological or orthographic representations, this triggers the activation of modality-independent central representations which provide, for example, details about the class or the meaning of a word (Drews et al. 1994).

Whereas there is agreement on the *general* account of word recognition and the mental lexicon outlined above, there is no consensus in the psycholinguistic literature as to whether morphologically complex words such as *disappear* are accessed and stored as full forms or on the basis of their constituents; this resulted in the proposal of several major models of (visual) word recognition (for overviews, see Assink, Vooijs & Knuijt 2000, Greber 1997, and McQueen & Cutler 1998). On the one hand, Taft and Forster (1975) suggested a model of prelexical morphological decomposition in which all polymorphic words are stripped of their prefixes. Only if this

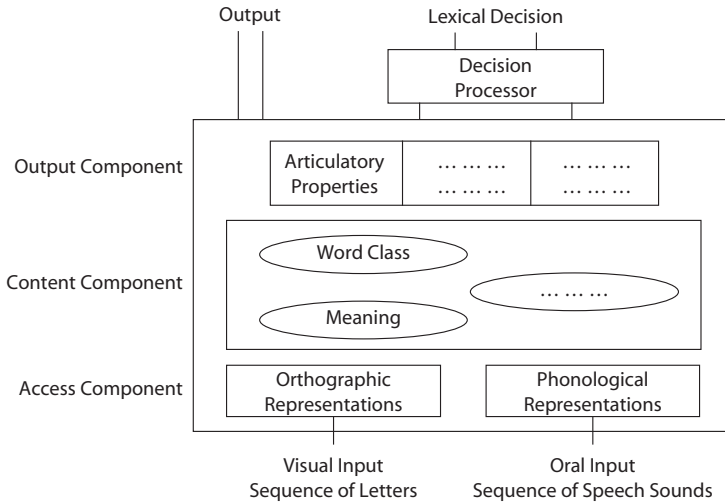


Figure 1. A generic model of word recognition and the mental lexicon (adapted from Drews et al. 1994:274). In the present paper, the Access and Content Components are of particular interest.

mechanism fails is there access based on the whole word. The default processing unit, for the present example, would therefore be [[dis] [appear]]. On the other hand, Butterworth (1983) and Henderson (1985) proposed full listing models in which both morphologically simple and complex words are stored and accessed as wholes. Thus, they have the same type of representation in the mind, in the present case [keep] and [disappear]. A number of other models include the possibility of both whole-word and constituent-based access and representation for polymorphemic words (Baayen & Schreuder 1999, Caramazza, Laudanna & Romani 1988, Frauenfelder & Schreuder 1992, Giraudo & Grainger 2000, Schreuder & Baayen 1995, Taft 1994). According to these accounts, *disappear* could be represented in both a holistic and an analyzed form. Thus, according to Caramazza et al. (1988), for example, a sequence of letters such as *disappear* would serve as visual input for both whole-word access representations (here: [disappear]) and constituent-based access representations (here: [[dis] [appear]]). If checking the incoming stimulus leads to a match with a stored representation, this triggers the activation of a constituent-based central representation. Although both types of access representations are involved in parallel, whole-word access is usually considered to be faster than constituent-based access.

The heterogeneity of findings concerning the processing of polymorphemic words and the resulting models raise two questions: How can these various approaches be reconciled? Are there any variables that influence the occurrence of whole-word or constituent-based access and representation? A number of recent studies have emphasized the importance of distributional properties as variables influencing the lexical representation and access of polymorphemic words. In an investigation of

lexical statistics, Schreuder and Baayen (1994) found that the ratio of pseudo-prefixation and prefixation in Dutch and English would make an obligatory mechanism of prelexical decomposition as postulated in Taft and Forster (1975) a less than optimal tool. Laudanna, Burani, and Cermele (1994) and Laudanna and Burani (1995) argued that (at least for Italian) prefixed words constitute a heterogeneous category due to various characteristics such as whole-word and constituent frequency, the co-occurrence of affixes with different kinds of bases or more general cognitive constraints. Since the word recognition system should be designed to work efficiently, these authors suggest it is reasonable to assume that different kinds of prefixed words are processed in different ways, not only within a language but also across languages. In other words, there might be cross-linguistic variation in the organization of the mental lexicon. Corroborative evidence for this argumentation comes from experimental studies on Dutch and French (Assink et al. 2000, Babin 1996).

In order to gain a more comprehensive picture of the organization of the mental lexicon, it is necessary to expand the scope of languages investigated experimentally. Individual languages and their morphological characteristics could be seen as different experimental 'conditions' under which the word recognition system operates (Frost & Grainger 2000). Currently, the 'English condition' has received extensive attention at the expense of other 'conditions' (Libben & Jarema 2002). Although German is a 'condition' that has received some attention in the literature, the intricacies of its rich prefixal system have thus far not been used extensively to inform models of psycholinguistic processing. Therefore, the present paper seeks to investigate some distributional properties of German verbs with inseparable prefixes (VIPs). These include items such as *verarmen* 'to become poor' (*ver-* + *arm* Adj. 'poor') or *erkennen* 'to recognize' (*er-* + *kennen* Verb 'to know'). The present paper also discusses the potential impact of these properties on the access and representation of VIPs. The importance of semantic characteristics of VIPs has already been discussed in detail elsewhere (Belz 1997, Mungan 1986).

2. GERMAN VERBS WITH INSEPARABLE PREFIXES. Prefixation is a common means of word-formation in German (Drosdowski 1984). As witnessed by examples (1)a and b and (2)a and b, German prefixes can be separable or inseparable:

- (1) a. Der Junge *schaut* den Film *an*. [Infinitive: *anschauen*]
 'The boy is *watching* the movie.'
- b. *Der Junge *anschaut* den Film.
- (2) a. *Der Hund *beißt* den Knochen *zer*. [Infinitive: *zerbeißen*]
 b. Der Hund *zerbeißt* den Knochen.
 'The dog is *biting* the bone *into pieces*.'

Whereas in (1)a *an-* can (in fact, must) be detached from its base, this is not true of *zer-* in (2)a. Hence, *an-* belongs to the group of separable prefixes, whereas *zer-*

belongs to the group of inseparable prefixes. The present study is concerned with the latter group.

VIPs are formed with any of the five prefixes *be-*, *ent-*, *er-*, *ver-*, and *zer-* (Dodd, Eckhard-Black, Klapper & Whittle 1996, Schmidt 1974, Stepanowa & Fleischer 1985). One of the characteristics of VIPs is that different prefixes can co-occur with the same base, with each prefix affecting the meaning of the base in a different way.

(3) Base verb:

Die Kinder *setzen* sich auf die Bank.

'The children are *having a seat* on the bench.'

(4) Prefixed verbs:

a. Die Soldaten *besetzen* das Dorf.

'The soldiers are *occupying* the village.'

b. Die Verbrechen *entsetzen* die Menschen.

'The crimes are *horrifying* the people.'

c. Die Mechaniker *ersetzen* die Batterien.

'The mechanics are *replacing* the batteries.'

d. Die Vorgesetzten *versetzen* den Beamten.

'The superiors are *transferring* the public servant.'

e. Die Chemikalien *zersetzen* das Metall.

'The chemicals are *corroding* the metal.'

Finally, VIPs can have either nominal, adjectival, or verbal bases:

(5) Die Spione *verschlüsseln* alle Nachrichten. [Noun – *Schlüssel* 'key']

'The spies are encoding all messages.'

(6) Die Bauern *verarmen*.

[Adjective – *arm* 'poor']

'The peasants are becoming poor.'

(7) Die Täter *verwischen* ihre Spuren.

[Verb – *wischen* 'to wipe']

'The culprits are wiping out their traces.'

The three characteristics outlined above make VIPs interesting from the point of view of access and representation in the mental lexicon. Whole-word processing would imply a uniform mental organization of the different kinds of VIPs. On the other hand, constituent-based processing would allow for the possibility that distributional properties, such as the morphological structure, play a role in processing and lead to a more diverse organization of the mental lexicon.

3. DISTRIBUTIONAL PROPERTIES OF GERMAN VIPs. The present paper examines several distributional properties of VIPs using the CELEX lexical database (Baayen,

	Initial Sequence				
	<i>be-</i>	<i>ent-</i>	<i>er-</i>	<i>ver-</i>	<i>zer-</i>
Entries/Types					
Total	1,313	365	683	1,643	153
Verbal	545	199	243	708	87
Verbal Base Types					
xAdj.	21	16	42	72	1
xNoun	138	68	23	196	12
xVerb	234	71	148	306	65
Other	131	43	20	131	7
Pseudo-Prefixed					
Total	181	20	128	33	18
Verbal	21	1	10	3	2

Table 1. The numeric distribution of items containing the initial sequences *be-*, *ent-*, *er-*, *ver-*, and *zer-* in the CELEX lexical database (Baayen et al. 1995) according to three factors. Entries/Types indicates overall frequencies, Verbal Base Types indicates the frequencies of different morphological structures, and Pseudo-Prefixed indicates the frequencies of words beginning with corresponding non-morphemic homographic two- or three-letter strings.

Piepenbrock & Gulikers 1995) which contains, for example, information on the occurrence and frequency of words and their morphological structure. This permits an investigation of three properties: (a) the overall number of entries/types, (b) the relative frequencies of different base types, and (c) the prefix/pseudoprefix ratios.

3.1. OVERALL NUMBER OF ENTRIES/TYPES. Determining the overall number of entries/types for a prefix (in CELEX) provides a simple measure of its general salience. In this paper, one has to differentiate verbal and non-verbal entries containing any of the five prefixes. There are, for example, nouns such as *Vertrieb* ‘distribution’ and adjectives such as *verstockt* ‘defiant’ in addition to verbal entries such as *verwischen* ‘to wipe out’. As shown in the top part of Table 1, the CELEX database indicates that items containing the initial sequence *ver-* are the most numerous, with 1,643 entries, 708 of which are verbs (43%). Entries containing *be-* such as *Bekenntnis* ‘confession’ or *befragen* ‘to question’ constitute the second-largest group, with 1,313 occurrences, 545 of which are verbs (42%). The group of *er-* items such as *Erfahrung* ‘experience’ and *erkennen* ‘to recognize’ comprises only 683 entries, 243 of which are verbs (36%). Items containing *ent-* constitute the second-smallest group, with 365 entries such as *Entfernung* ‘distance’ and *entsetzen* ‘to horrify’, 199 of which are verbs (55%). Entries containing *zer-* such as *Zerstörung* ‘destruction’ and *zersetzen* ‘to corrode’ constitute the smallest group, with 153 items; the 87 verbs represent 57% of these entries.

3.2. RELATIVE FREQUENCIES OF DIFFERENT BASE TYPES. Establishing the relative frequencies of different base types clarifies patterns of morphological structure across

different VIPs. In this paper, the respective prominence of VIPs conforming to the following structures is of particular interest: (a) prefix plus simple nominal base (xNoun) such as in *verschlüsseln* (ver- + *Key* Noun 'key'); (b) prefix plus simple adjectival base (xAdj.) such as in *verarmen* (ver- + *poor* Adj. 'poor'); (c) prefix plus simple verbal base (xVerb) such as in *verwischen* (ver- + *wipe* Verb 'wipe').

As far as VIPs in *ver-* are concerned, xVerb is the most common morphological structure. As shown in the middle part of Table 1, there are 306 such entries, e.g. *verwischen* 'to wipe out' (ver- + *wischen* Verb 'to wipe'), which account for about 43% of all verbal entries for this prefix. The second most prominent morphological structure is xNoun with 196 entries. This means that items such as *verschlüsseln* (ver- + *Schlüssel* Noun 'key') make up around 28% of all verbal entries in *ver-*. The least common of the three morphological structures of interest is xAdj., which accounts for only about 10% of all verbal entries. There are 72 verbs such as *verarmen* (ver- + *arm* Adj. 'poor'). Approximately 19% of all verbal *ver-* entries do not conform to any of these patterns, e.g. *verabscheuen* 'to despise' (xxAdj.). These are classified as 'Other' in Table 1 and will not be discussed further in this paper. (The category 'Pseudo-Prefixed' is discussed in section 3.3.)

As for VIPs in *be-*, the most common morphological structure is again xVerb. This accounts for about 43% of all verbal entries with initial *be-*. There are 234 entries such as *besetzen* 'to occupy' (be- + *setzen* Verb 'to sit'). The second most common morphological structure for verbs formed with this prefix is xNoun. The 138 entries that follow the pattern of *bedachen* 'to roof' (be- + *Dach* Noun 'roof') constitute 25% of all the verbal entries. Finally, verbs conforming to the structure xAdj. constitute the smallest group, with 21 items such as *begrünen* 'to make green' (be- + *grün* Adj. 'green'), which account for about 4% of all verbal entries in *be-*. (The category 'Other' comprises about 24% of this group.)

Concerning VIPs in *er-*, the morphological structure xVerb is once more the most prominent one, comprising around 61% of all verbal entries. There are 148 items such as *ersetzen* 'to replace' (er- + *setzen* Verb 'to sit'). In contrast to the previous VIP groups, however, the morphological structure xAdj. is the second most common one and accounts for approximately 17% of all verbal entries in *er-*; there are 42 items such as *erblassen* 'to fade' (er- + *bläß* Adj. 'pale'). The least common morphological structure for verbal *er-* entries is xNoun, which comprises only 9% of the total. There are 23 items such as *erdolchen* 'to stab with a dagger' (er- + *Dolch* Noun 'dagger'). (Approximately 8% of all verbal *er-* entries are classified as 'Other'.)

As for VIPs in *ent-*, the predominant morphological structure is xVerb, which accounts for about 36% of all verbal entries. There are 71 items such as *entsetzen* 'to horrify' (ent- + *setzen* Verb 'to sit'). The xVerb set is closely followed by entries conforming to the morphological structure xNoun, constituting about 34% of the verbal entries. There are 68 verbs such as *entgleisen* 'to derail' (ent- + *Gleis* Noun 'rail'). Finally, the least common of the three morphological structures of interest is xAdj., since it accounts for only about 8% of the verbal entries in *ent-*. There are 16 entries such as *entfernen* 'to take away' (ent- + *fern* Adj. 'far'). (The category 'Other' comprises approximately 22% of all verbal *ent-* entries.)

Lastly, concerning VIPs in *zer-*, *xVerb* is the most common morphological structure and accounts for almost 75% of the verbal entries. There are 65 entries such as *zer-setzen* (*zer-* + *setzen* Verb 'to sit'). The second most common morphological structure is *xNoun*, comprising around 14% of the verbal entries in *zer-*. There are 12 items such as *zertrümmern* 'to break to pieces' (*zer-* + *Trümmer* Noun 'ruins'). The morphological structure *xAdj.* is the least common, with just one entry, *zermürben* 'to wear down' (*zer-* + *mürbe* Adj. 'brittle'), which represents about 1% of the verbal entries. (About 8% of all verbal *zer-* entries are classified as 'Other'.)

3.3. PREFIX/PSEUDOPREFIX RATIOS. Determining the prefix/pseudoprefix ratios across prefixes provides a measure of the respective prominence of real VIPs such as *verarmen* (*xAdj.*) and sequences containing parallel non-morphemic homographic bigrams or trigrams such as the *ver-* in *vertikal* 'vertical' (cf. *re-* in English *restart* vs. *reality*).

Verbs containing the initial sequence *ver-* are almost never subject to pseudo-prefixation. There are only three verbal entries where the initial sequence is a non-morphemic homographic trigram, such as in the Latinate form *verifizieren* 'to verify'. This corresponds to a pseudo-prefixation rate of 0.4%. For all (verbal and non-verbal) *ver-* entries in the analysis, the number of pseudo-prefixed items is 33, which corresponds to an overall pseudo-prefixation rate of 2%, as is shown at the bottom of Table 1.

Verbs formed with the initial sequence *be-* are more likely to be subject to pseudo-prefixation. There are 21 verbal entries where the initial sequence is a homographic bigram, for example, in *beben* 'to tremble'. The pseudo-prefixation rate, therefore, corresponds to roughly 4%. Adding instances of pseudo-prefixation for all non-verbal entries of *be-* raises the number of pseudo-prefixed items to 181, and the overall percentage to almost 14%.

Verbs containing the initial sequence *er-* are similar to *be-* verbs in that the pseudo-prefixation rate is roughly 4%. There are 10 items such as the Latinate form *erodieren* 'to erode' where the initial sequence is a non-morphemic homographic bigram. For (all verbal and non-verbal) *er-* entries, there are 128 pseudo-prefixed items which corresponds to a total rate of about 19%.

Verbs formed with the initial sequence *ent-* are almost never subject to pseudo-prefixation. The database indicates only one instance, *entern* 'to board', where the initial sequence is a homographic trigram. This corresponds to a pseudo-prefixation rate of only 0.5%. Adding instances of pseudo-prefixation for all non-verbal entries of *ent-* raises the number of pseudo-prefixed items to 20 and the overall percentage to about 5%.

Finally, verbs containing the initial sequence *zer-* have a low pseudo-prefixation rate of around 2%. There are two items such as *zertifizieren* 'to certify' where the initial sequence is a homographic trigram. As far as all (verbal and non-verbal) *zer-* entries are concerned, there are 18 pseudo-prefixed items, which corresponds to a total rate of about 12%.

4. IMPLICATIONS FOR MORPHOLOGICAL PROCESSING. One of the questions asked at the beginning of this paper was whether morphologically simple and complex

words are subject to distinct processing mechanisms in the human mind. A lack of difference would suggest a uniform organization of the mental lexicon, whereas differential processing would indicate the existence of a more diverse organization of words in the mind. A look at the psycholinguistic literature on word recognition and the mental lexicon indicated some measure of disagreement in the treatment of morphologically complex words such as *disappear*: Whereas some models support the notion of whole-word processing ([disappear]), others endorse constituent-based processing ([dis] [appear]). Yet another school of thought suggests the possibility of both whole-word and constituent-based processing. Recently, distributional properties have been identified as variables capable of influencing the occurrence of whole-word or constituent-based processing for polymorphemic words. The present paper investigated three distributional properties of German VIPs, namely (a) the overall number of entries/types, (b) the relative frequencies of different base types, and (c) the prefix/pseudo-prefix ratios.

The analysis of the overall number of entries/types revealed that *ver-* is the most numerous prefix, whereas *zer-* is the least numerous. This implies a lower degree of salience for low-frequency prefixes such as *zer-*. If affix salience is interpreted as the probability of these items to serve as access units and to possess their own mental representation, then words formed with low-frequency prefixes such as *zer-* are good candidates for whole-word processing. On the other hand, the potentially higher degree of salience of high-frequency prefixes such as *ver-* could make these items better candidates for constituent-based processing. The results obtained by Laudanna et al. (1994) and Laudanna and Burani (1995) indicate that the number of types is not relevant in the processing of Italian prefixed words. However, these authors also argue in favor of cross-linguistic variation, an argument which has been reiterated more recently by Frost and Grainger (2000). From this perspective the investigation of the understudied German VIPs is well motivated.

An analysis of the relative frequencies of different base types revealed that VIPs with verbal bases (following the morphological structure xVerb) are the most common for all five prefixes. With the exception of *er-* verbs, VIPs with adjectival bases (following the morphological structure xAdj.) are the least common. The actual distribution changes from prefix to prefix, with some VIPs having more balanced patterns (e.g. those formed with *ent-*), and other VIPs having less balanced patterns (e.g. those formed with *zer-*). It is, therefore, reasonable to assume that VIPs conforming to less prominent patterns lend themselves better to holistic processing, whereas more salient structures might be more suited to constituent-based processing. Indeed, experiments on French prefixed words suggest the occurrence of differential processing for various morphological structures (Babin 1996).

The analysis of the prefix/pseudo-prefix ratios revealed that verbs containing the initial sequences *ver-* or *ent-* are almost never subject to pseudo-prefixation; the respective rates are 0.4% and 0.5%. The inclusion of all (verbal and non-verbal) entries containing these sequences raises the rates to 2% and 5%, respectively. On the other hand, both verbs containing *be-* or *er-* have pseudo-prefixation rates of around

4%. Including all entries into the count raises the pseudo-prefixation rates to 14% and 19%, respectively. It is reasonable to assume that the higher the number of real prefixes, the more successful the parsing and morphological decomposition of prefixed words. Put differently, a high degree of real prefixation for a given group of verbs should increase the likelihood for VIPs in that group to be processed on the basis of their constituents, because efficient parsing can be guaranteed. This reasoning is in line with the argumentation of Schreuder and Baayen (1994) concerning prefixation and pseudo-prefixation in Dutch and English. It is also consistent with the findings of Laudanna et al. (1994) and Laudanna and Burani (1995) on prefixed words in Italian.

Indeed, preliminary data from a new experimental study on *ver-* verbs (Schirmeier, Derwing & Libben in preparation) suggest the occurrence of morphological decomposition and differential processing as a function of morphological structure.

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TEMPORAL COMPARISON OF WORD BOUNDARY CONSONANTS IN FRENCH: THE SPEAKER-SPECIFICITY ISSUE

MANUEL SINOR

Department of Linguistics, University of Alberta

INDIVIDUAL SPEAKER CHARACTERISTICS are a potentially large source of variation in the duration of concatenated speech segments. Several of the factors affecting segmental durations in connected speech (cf. Klatt 1976 and O'Shaughnessy 1981) tend to be speaker-specific. Linguistic stress may thus depend on the speaker's individual articulatory strategies (de Jong 1995) or choices of word-internal rhythmic alternations (Kelly 1988), while speech rate may vary with such factors as age (Sachs, Brown & Salerno 1976; Duchin & Mysak 1986; Haselager, Slis & Reitveld 1991), gender (Byrd 1992; Fitzsimons, Sheahan & Staunton 2001), or dialectal origin (Byrd 1992). Speaker-specificity has also been frequently attested by durational measurements of coarticulated segments (Bartkova 1988; Johnson, Ladefoged & Lindau 1993; Van den Heuvel, Rietveld & Cranen 1994; *inter alia*). Against this background, and with regard to French, we consider the possible impact of speaker characteristics on the duration of consonants juxtaposed across lexical boundaries.

We begin with a description of two pervasive word boundary phenomena in French, *enchaînement* and its *liaison* variant. We then outline the investigation in which the present acoustic study is embedded and present the empirical aims of our durational measurements. This is followed by a discussion of the possible origins of speaker-dependent durational variation across word boundary consonants. The issue of speaker-specificity is further examined in the replication of an acoustic experiment by Yersin-Besson and Grosjean (1996).

The term *enchaînement* refers to the linkage of a word-final consonant with the initial consonant or vowel of a following word, as in examples (1)a and (2)a. In these examples, the word-final stops [k] and [t] of *cinq* [sɛ̃k] 'five' and *sept* [sɛt] 'seven' merge with the following words *loups* [lu] 'wolves' and *arts* [aʁ] 'arts'. This process makes the lexical affiliation of [k] and [t] potentially ambiguous, especially since, in these examples, (1)a and (2)a are homophonous with the meaningful though unrelated (1)b and (2)b. Such cases of homophony, highlighted here by the wide phonetic transcriptions [sɛ̃klu] and [sɛtaʁ], can actually cause failures to distinguish between *enchaînement* and no-*enchaînement* phrases (Yersin-Besson & Grosjean 1996).

- | | |
|-------------------------|--|
| (1) a. <i>cinq lous</i> | (<i>Enchaînement</i> with a word-initial consonant) |
| [sɛ̃klu] | |
| 'five wolves' | |
| b. <i>Saint-Cloud</i> | (No <i>enchaînement</i>) |
| [sɛ̃klu] | |
| 'Saint-Cloud' | |

- (2) a. *sept arts* (Enchaînement with a word-initial vowel)
 [setaʁ]
 'seven arts'
 b. *c'est tard* (No enchaînement)
 [setaʁ]
 'it's late'

A variant of the process of enchaînement is *liaison*. Here, linking occurs exclusively before a word-initial vowel, and affects a consonant which is not pronounced in the citation form of its carrier word. For example, the latent word-final [t] of *petit* [pøti] 'small' resurfaces before the first vowel of *ami* 'friend' in *petit ami* [pøtitami] 'boyfriend'. Again, as shown in examples (3)a and (3)b, the linking consonant and its carrier enchaînement phrase become potentially ambiguous with a word-initial consonant and its carrier no-enchaînement sequence. Native listeners have been found to be misled by such ambiguities, thus confusing liaison phrases with their no-enchaînement counterparts (Wenk & Wioland 1982; Laeuffer 1985; Yersin-Besson & Grosjean 1996).

- (3) a. *petit ami* (Enchaînement with liaison)
 [pøtitami]
 'boyfriend'
 b. *petit tamis* (No enchaînement)
 [pøtitami]
 'little sieve'

Following Bennett (1991), we may refer to enchaînement with liaison and enchaînement without liaison conjointly—and loosely—by the term (*external*) *sandhi*, since both involve phonological changes caused by the concatenation of two word forms.

The ongoing research in which this study is embedded (Sinor in preparation) examines whether native and non-native listeners of French can distinguish between ambiguous sandhi and non-sandhi phrases on the basis of durational differences between word-initial and enchaînement consonants. The main contribution of this ongoing research consists in comparing temporal cue strategies of word onset identification by French speakers of different proficiency levels. Within this investigation, a series of acoustic experiments serves two aims. First, our intended comparison of word segmentation strategies requires that we document and measure naturally produced durational variation at word boundaries, variation which a listener may in turn exploit for the purpose of word string disambiguation. Second, our measurements readdress the controversial issue of temporal distinguishability between word-initial consonants and consonants undergoing enchaînement with or without liaison. This controversy arose from recent durational studies (Laeuffer 1985, Rialland 1985, Wauquier-Gravelines 1995, Yersin-Besson & Grosjean 1996), which challenged the traditional analysis of enchaînement and word-initial

consonants as acoustically, hence temporally identical (e.g., Nyrop 1925, Pernot 1937, Grammont 1960, Encrevé 1988).

In the present study, we consider a methodological issue relevant to the acoustic component of this ongoing investigation, namely the possible impact of individual speaker characteristics on the production of enchaînement and word-initial consonants. The need to address this issue emerged from the fact that several of the aforementioned durational studies, notably Wauquier-Gravelines (1995) and Yersin-Besson and Grosjean (1996), had drawn their conclusions from the observation of consonants produced by only one speaker.

A variety of factors may motivate the use of a small sample in studies of segmental durations. One such factor is the development of durational rules for speech synthesis systems capable of mimicking the behavior of a single speaker (O'Shaughnessy 1981). More pragmatic motivations include the limited access to a pool of native speakers, the confrontation of perceptual findings with the temporal properties of the relevant stimuli, and the pilot nature of the study's durational measurements. Yersin-Besson and Grosjean's one-speaker experiment falls under the last two categories, as we shall see from the context of this experiment.

Yersin-Besson and Grosjean's overall study of the effects of enchaînement on spoken word recognition involved the following tasks and findings. An orthography-based discrimination task first suggested that enchaînement with liaison was potentially more ambiguous for a listener than enchaînement without liaison. A word-spotting task confirmed that words affected by enchaînement with liaison were more slowly recognized on-line than their no-liaison and no-enchaînement counterparts. In this context, the final, acoustic experiment sought to identify interconsonantal durational variation that might explain the perceptual salience of enchaînement-without-liaison consonants over their enchaînement-with-liaison counterparts. The authors (*ibid.* 1996:25) acknowledged the pilot nature of this final experiment by highlighting the need for more detailed acoustic measurements, which might account for the relative perceptibility of enchaînement with and without liaison. We argue, more specifically, that these further measurements call for the acknowledgment and the control of speaker-specific effects on segmental durations at word boundary.

Two main aspects of speaker-specificity may be considered: intra- and inter-speaker variability. For a given utterance or set thereof, intra-speaker variability applies to the production patterns of a single speaker, whereas inter-speaker variability differentiates the productions of several speakers. Intra-speaker variability may be caused by various factors such as head movements or lapses between recording sessions (*cf.* van den Heuvel 1996), and inter-speaker variability may relate to idiosyncratic factors such as the organic features of a speaker, e.g. vocal tract length, which has been shown to affect temporal patterns of speech production (*ibid.* 1996). For the present purposes, however, it is mainly with reference to sociolinguistic and idiolectal criteria that we shall attempt to trace the sources of inter-speaker variability in the durations of word boundary consonants.

If laryngealization and aspiration, both possible acoustic correlates of word boundary, are optional across English dialects (Gow 1993), it seems plausible that the relative length of enchaînement consonants should also be affected by dialectal origin in French. Optionality is indeed an important trademark of French liaison, particularly between words that are closely linked syntactically, such as a verb and a complement. Thus, in the imperative sentence (4)a, the bracketed [z] indicates the acceptability of a non-realized inflectional marker on the verb. Such examples lie between the orthoepic categories of mandatory liaison, e.g. the resurfacing of the plural [z] on the determiner of (4)b, and incorrect liaison, e.g. the insertion of a word-final [t] between the singular noun and the adjective of (4)c.

- (4) a. *sois attentif* (Optional *liaison*)
 [swa(z)atâtif]
 ‘be careful’
 b. *tes amis* (Mandatory *liaison*)
 [tezami]
 ‘your friends’
 c. *le chat angora* (Incorrect *liaison*)
 [løfatāgoʁa]
 ‘the angora cat’

Armstrong (2001) reports substantial evidence whereby the realization of optional liaison seeks to indicate social and linguistic prestige, and the frequency of liaison occurrences in general tends to relate to age, sex, social class, and dialect. Among the studies under review, Encrevé (1988) compared the frequencies with which various French politicians not only mark optional liaison, but also insert a glottal stop between the liaison consonant and its following vowel. Example (5) illustrates this process, with a bracketed [t] indicating the optionality of liaison.

- (5) *qui sont en vérité les siens* (Optional *liaison*, glottal stop insertion)
 [kisō(t)ʔävεʁitelesjē]
 ‘which are truly his/hers’

Such examples are analyzed as cases of ‘liaison without enchaînement’, since a latent word-final consonant resurfaces before a vowel (liaison) but its linkage with the following word (enchaînement) is interrupted by an intervening glottal stop. The glottal stop, in this example, adds a silent phase to the closure of the pivotal [t]. We are thus dealing here with the durational variation of a sandhi consonant conditioned by speaker-related factors such as social class and individual speaking style.

The possibility of speaker-specific durational patterns is also worth considering with regard to no-enchaînement/word-initial consonants. Word-initial consonant elongation has been reported in several languages, such as English or Dutch (Oller 1973; Nakatani & Schaffer 1978; Quené 1992), but the extent of this lengthening has

Enchaînement type	Enchaînement examples (E)	No-enchaînement equivalents (NE)
with liaison (EL)	<i>son oeuf</i> [sõnœf] ‘his/her/its egg’	<i>son neuf</i> [sõ(#)nœf] ‘new sound’
without liaison, consonant-vowel (E-cv)	<i>chaque ours</i> [ʃakuʁs] ‘each bear’	<i>chaque course</i> [ʃak(#)kuʁs] ‘each race’
without liaison, consonant-consonant (E-cc)	<i>neuf lames</i> [nœflam] ‘nine blades’	<i>neuf flammes</i> [nœf(#)flam] ‘nine flames’

Table 1. Examples of recorded enchaînement and equivalent no-enchaînement sequences.

been found to undergo potentially substantial variation between speakers. Quené (1992) thus observed that one of his four Dutch-speaking consultants hardly ever lengthened word-initial consonants. Similarly, Fougeron (2001) found that the durational properties of French segments positioned at the onset of words—as well as of syllables, intonational and accentual phrases—depended not only on the articulators and segment types but also on the speakers. These findings confirm our assumption that the temporal properties of word-boundary consonants, whether linking or word-initial, may be driven by the linguistic intentions, style or background of a given speaker. This possibility, in turn, provides further encouragement to reassess the claim that word-initial consonants are longer than their enchaînement counterparts (Rialland 1985; Wauquier-Gravelines 1995; Yersin-Besson & Grosjean 1996).

On this basis, we further examine the likelihood of speaker-specificity in the durational properties of word boundary consonants by replicating the acoustic component of Yersin-Besson and Grosjean’s study (1996) with another native French speaker. Our experiment, like its predecessor, investigates the enchaînement scenarios described earlier: enchaînement without liaison before a word-initial consonant (E-cc), enchaînement without liaison before a word-initial vowel (E-cv), enchaînement with liaison (EL). These three categories can in turn be grouped under the overall E category of enchaînement consonants, which we shall compare with the NE category of no-enchaînement/word-initial consonants.

1. THE STUDY.

1.1. MATERIALS. Yersin-Besson and Grosjean’s original set of 24 enchaînement sequences was again divided into the subgroups E-cc, E-cv and EL, and each of these sequences was paired with its no-enchaînement (NE) counterpart, as shown in Table 1. The diacritic (#), in the wide phonetic transcriptions of the NE sequences, indicates an optionally realized word boundary. All remaining enchaînement and NE sequences are listed in Appendix A.

Also along the lines of the original experiment, the target sequences were embedded in short excerpts of two sentences designed to maintain a stable prosody throughout the critical phrases. The use of two contextual sentences avoided a list reading effect. The first of these introductory sentences was randomly picked among the sentences listed in (6):

- (6) a. *Cela a éveillé notre intérêt* 'This has awakened our interest'
- b. *Cette chose a attiré notre attention* 'This thing has drawn our attention'
- c. *C'est une chose tout à fait intéressante* 'This is a most interesting thing'

In the second sentence, the phrase *il s'agit de* ('this is about') preceded the target sequence, itself followed by a prepositional syntagm and the adverb *certainement* ('certainly'). The sequence *cette huile* ('this oil') thus appeared in the overall excerpt reproduced in (7):

- (7) *Cela a éveillé notre intérêt. Il s'agit de cette huile de Rembrandt certainement*
'This has awakened our interest. This is about that Rembrandt oil certainly'

1.2. **SPEAKER AND PROCEDURE.** A male native speaker of standard French from the Ile-de-France region recorded the 24 pairs of carrier sentences. He was preferred to a locally-based French Canadian because the speaker who had produced Yersin-Besson and Grosjean's sequences was also from France. There was also the possibility that some of the sequences recorded for the present study might be used as stimuli for a subsequent perceptual experiment. The standard variety of French seemed more likely, during such an experiment, to neutralize any bias that the bilingual listeners might have towards a particular dialect of Canadian French.

The speaker read the sentences at a moderate speed and was given no instruction regarding the pronunciation of the critical consonant. These precautions further ensured the production of the target sequences in a neutral, constant prosody. The production of the enchainement and no-enchainement members of each sequence pair within different recording blocks also prevented marking overt contrasts between potentially homophonous phrases.

The 24 pairs of carrier sentences were recorded in a sound-treated studio using a headset microphone (Shure SM10A) plugged into a dbx 760x microphone preamplifier and an A/D-D/A converter (Lucid Technology ADA 1000). The recorded materials were digitized at 44.1 kHz. The critical word pairs were then extracted using CoolEdit software and stored at a 22.05 kHz sampling-rate with 16-bit resolution onto a Dell PC.

1.3. **MEASUREMENTS AND DATA PREPARATION.** The segmentation strategy used for delimiting the pivotal consonants (as underlined in the following transcriptions) was essentially the same as Yersin-Besson and Grosjean's. The onset of the pivotal consonant corresponded to the offset of the previous word's final segment, which was usually a vowel, e.g. [õ] in *mon air* [mõnεʁ] 'my manner', or sometimes a lateral, e.g.

	Enchaînement with liaison (EL)	Enchaînement without liaison before a word- initial vowel (E-cv)	Enchaînement with- out liaison before a word-initial conso- nant (E-cc)
Present ratios	0.90	0.78	0.68
Original ratios	0.90	0.64	0.54

Table 2. Average E/NE duration ratios across enchaînement categories

[ʁ] in *leurs ailes* [løʁzɛl] ‘their wings’. Similarly, the offset of the pivotal consonant corresponded to the onset of the following word’s initial segment, e.g. [a] in *cent as* [sɑ̃tas] ‘a hundred aces’ or [l] in *neuf lames* [nœflam] ‘nine blades’. Determination of segment onsets and offsets was done with an in-house interactive program allowing visualization of oscillograms and spectrograms with auditory feedback.

The resulting measurements led to the computation of percentages of pivotal consonant durations over carrier sequence durations. For example, the phrase *petit ami* ‘boyfriend’ was produced with a pivotal consonant duration of 62 ms and an overall sequence duration of 418 ms. Hence a duration percentage of 14.8% for the pivotal stop [t] in this phrase. The original idea behind this computation was to reduce the statistical impact of speech rate variation across two-word sequences and their pivotal consonants. Such variation was indeed characteristic of Yersin-Besson and Grosjean’s sequences, as produced in the present experiment. Despite the same number of syllables across categories, sequences with enchaînement were spoken significantly longer than those without, as shown by a Wilcoxon signed-ranks test of the E and NE sequence durations, $z = -2.677$; $p < .01$.

Data preparation finally consisted in computing E/NE duration ratios, i.e. ratios of the duration percentages between the enchaînement items (E-cc, E-cv or EL) and no-enchaînement (NE) items of every sequence pair. For example, the pivotal consonants of *cette rousse* [setʁus] ‘this red-haired girl’ and *cette trousse* [settʁus] ‘this pencil case’ lasted 54 ms and 120 ms respectively, out of sequence durations of 397 ms and 501 ms. Hence the percentages of 13.6% and 24.1%, and a E/NE ratio of 0.57.

2. RESULTS. All stimulus pairs produced an E/NE ratio inferior to 1, confirming Yersin-Besson and Grosjean’s observation that word-initial, NE consonants were longer than their E equivalents. But this pattern is in great part explained by the presence of geminate boundary consonants in the NE counterparts of the E-cv and E-cc sequences, as in the above *chaque course* [ʃakkuʁs] ‘each race’ and *neuf flammes* [nœfflam] ‘nine flames’. In contrast, the NE equivalents of the EL sequences contained singleton boundary consonants, as in the above *son neuf* [sõncef] ‘new sound’. It was therefore predictable that the E/NE duration ratios in both studies should be closer to 1 in EL sequences than in E-cv and E-cc sequences (cf. Table 2).

Also unsurprising, in this context, is the replication of significant effects of sequence type on the E/NE ratios, $F(2,21) = 4.13$, $p < .05$. Some of the results of the

original post-hoc analysis were also reproduced by our planned comparisons of the E categories: a non-significant difference between the E-cv and E-cc conditions, [$t(21) = 1.23$, n.s.] and a significant difference between EL and E-cc [$t(21) = 2.86$, $p < .05$, Bonferroni-adjusted]. Despite these similarities between the original and present experiments, two further sets of results revealed speaker-specific durational patterns. The first results were drawn from a meta-analysis of the two studies, consisting in a two-way analysis of variance (ANOVA) of word boundary condition and experiment/speaker effects on the E/NE duration ratios. Although this ANOVA showed no significant effect for the interaction of speaker and word boundary condition [$F(2,42) = 1.10$, n.s.], it revealed significant speaker effects on the E/NE duration ratios [$F(1,42) = 4.42$, $p < .05$]. Secondly, our planned comparisons failed to replicate a significant difference between EL and E-cv consonant durations [$t(21) = 1.63$, n.s.] and between EL and the combined categories E-cc and E-cv [$t(21) = 2.60$, n.s.].

To summarize, both studies highlighted the durational similarity of enchaînement-without-liaison segments preceding vowels or consonants and the durational superiority of word-initial consonants over their sandhi equivalents. But, as we have seen, the salience of word-initial consonants may have been caused by the presence of pivotal geminates in two thirds of the NE phrases. Moreover, the failure to replicate the original EL vs. E-cv and E-cc vs. E-cv contrasts means that the overall durational hierarchy found in the previous experiment is only partially reproduced here. The $E < EL < NE$ order now becomes closer to the $E, EL < NE$ scenario, the inserted comma indicating the potential indistinguishability of liaison (EL) and no-liaison (E) enchaînement consonants on a temporal basis.

3. CONCLUSIONS. In light of our discussion on speaker-specificity, and considering our efforts to reproduce all conditions of the original experiment except for the speaker, we may draw the following conclusions. The above results reflect the partial replicability of Yersin-Besson and Grosjean's findings, challenge their claim that enchaînement-without-liaison consonants are more salient than enchaînement-with-liaison consonants, and confirm that the reliance on measurements from a single speaker weakens the generalizability of the durational patterns being reported. Indeed, such reliance undermines the possibility for explaining temporal variation across word boundary consonants as a function of systematic linguistic contexts such as the liaison environment, rather than as the product of speaker idiosyncrasies.

Thus, this study has highlighted the likelihood of speaker-dependent durational variation across word boundary consonants in French. While the intricacies of such variation will require further targeted experimentation, the evidence at present points to the need for methodological refinements to control for speaker-dependent effects on consonant duration at word boundaries.

APPENDIX A: WORD SEQUENCES DRAWN FROM
YERSIN-BESSON AND GROSJEAN (1996)

	Enchaînement		No-enchaînement	
	Sequence	Translation	Sequence	Translation
Enchaînement with liaison (EL)	ancien hectare son oeuf ton ombre mon air petit ami cent as premier épi leurs ailes	<i>old hectare</i> <i>his/her/its egg</i> <i>your shadow</i> <i>my manner</i> <i>boyfriend</i> <i>a hundred aces</i> <i>first wheat ear</i> <i>their wings</i>	ancien nectar son neuf ton nombre mon nerf petit tamis cent tasses premier répit leur zèle	<i>old nectar</i> <i>new sound</i> <i>your number</i> <i>my nerve</i> <i>little sieve</i> <i>a hundred cups</i> <i>first respite</i> <i>their zeal</i>
Enchaînement without liaison between a consonant and a vowel (E-cv)	cinq ancres chaque ours cette huile grande anse mille armes même arbre leur as fausse heure	<i>five anchors</i> <i>each bear</i> <i>this oil</i> <i>big handle</i> <i>thousand arms</i> <i>same tree</i> <i>their ace</i> <i>wrong hour</i>	cinq cancre chaque course cette tuile grande danse mille larmes même marbre leur race fausse soeur	<i>five dunces</i> <i>each race</i> <i>this tile</i> <i>great dance</i> <i>thousand tears</i> <i>same marble</i> <i>their race</i> <i>false sister</i>
Enchaînement without liaison between a consonant and a consonant (E-cc)	chaque rue cinq rimes petites ruelles cette rousse girl charmante reine neuf lames longues rênes solides rats	<i>each street</i> <i>five rhymes</i> <i>small alleys</i> <i>this redhead</i> <i>girl</i> <i>lovely queen</i> <i>nine blades</i> <i>long reins</i> <i>solid rats</i>	chaque crue cinq crimes petites truelles cette trousse charmante traîne neuf flammes longue graine solide drap	<i>each flood</i> <i>five crimes</i> <i>little trowels</i> <i>this pencil case</i> <i>lovely dress</i> <i>train</i> <i>nine flames</i> <i>long seed</i> <i>solid cloth</i>

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THE GRAMMAR OF ENGLISH REFLEXIVES: A NEW VIEW

NANCY STERN

City College, City University of New York

ENGLISH *-SELF* FORMS¹, best known as reflexive pronouns, are often cited as an example of the important role of syntax in human language, because they are said to require a clause-internal antecedent. In this paper I will propose that the distribution of *-self* forms can be better explained by a semantic/pragmatic property than by a syntactic rule².

According to traditional grammar—and modern linguistic theories based on the traditional account—the answer to the question ‘when are *-self* pronouns used’ is that *-self* forms have two basic uses: reflexive and emphatic. Reflexive uses are those in which the pronoun refers to a coreferent noun phrase elsewhere in the clause, as in (1) and (2):

- (1) Martha saw **herself**
- (2) George talked to **himself**.

The other well-known use of *-self* pronouns is as emphatics, or intensifiers, which are appositive uses of these forms, shown in (3) and (4):

- (3) The teacher **herself** didn’t know the answer.
- (4) I’ve never been there **myself**.

This is the Reflexive Pronoun account—that there is a syntactic requirement for the use of *-self* forms in certain structural environments. This account forms the basic schema for the analysis of *-self* pronouns by formalists and functionalists alike. Most research on *-self* has accepted this structural account, and merely tried to refine it by tweaking binding domains, positing additional structure, proposing separate modules of grammar, or postulating extensions from the reflexive prototype (e.g., Chomsky 1981, 1982; Pollard & Sag 1992; Reinhart & Reuland 1993; Van Hoek 1997).

1. PROBLEMS WITH THE NOTION THAT *-SELF* IS A REFLEXIVE PRONOUN. As linguists know, there are some very serious counterexamples to the Reflexive Pronoun account (Lees & Klima 1963; Chomsky 1965; Lakoff 1968; Ross 1970; Zribi-Hertz 1989 and others). The rough-and-ready generalization that *-self* pronouns are used as reflexives faces two types of problems. The first analytical obstacle is that *-self* forms have many other uses. The examples in (5) through (7) show just a small sample of *-self* pronouns used in ways that cannot be labeled as either reflexive or emphatic. (Subjects of clauses are in italics to illustrate that these are not typical reflexive uses.)

	reflexive environments	non-reflexive environments
-self pronouns	+	+
simple pronouns	+	+

Table 1. *Distribution of -self and simple pronouns.*

- (5) 'Let Me Count the Times' is about a man who compiles statistics on his love life, *which* includes an affair with **himself**. (SHE)
- (6) John said *there* was a picture of **himself** in the post office.
- (7) She felt a sudden rush of power, the power to stay alive. She'd kept others alive with her stories when they'd come close to being found. This time *it* was for **herself**. (HSR 383)

Much study has been devoted to the properties of examples like these, and we will return to them later. For now, the question is: if -self forms are reflexive pronouns, why are they showing up in these other non-reflexive contexts?

There is another serious difficulty for the claim that -self forms are reflexive pronouns: simple pronouns occur in reflexive environments as well.

- (8) *He* carried an umbrella with **him**.
- (9) *She* pulled the blanket toward **her**.
- (10) Sometimes when I look in the mirror, *I* don't recognize **me**.
- (11) *He* would have with **him** a bundle of food... (LGI 160)

Table 1 summarizes the data we have considered so far, which show that -self pronouns occur in reflexive environments and in non-reflexive environments, and that simple pronouns do too.

The point of Table 1 is that reflexivity is not the conditioning factor that determines whether -self pronouns will occur. The construct of 'reflexivity' does not answer the question posed at the outset: what accounts for the distribution of -self pronouns?

2. A NEW VIEW. Before continuing, let's look at emphatic uses for just a moment. Among appositive uses such as those in (3) and (4), -self forms frequently occur as a 'heads-up' warning to hearers, a notice that they should pay attention because there might be something about the referent that is not anticipated. However, invented examples like (3) and (4) are of limited value, and the role of real world data is apparent when we consider naturally occurring utterances that contain the contextual complexity that motivates speakers' choices of forms. In (12), one of the motivations for the use of *herself* is that the actions of the referent are rather surprising:

- (12) I was very sick as a child, and none of the doctors could figure out what was wrong with me. But Mom was persistent. She did research at a

medical school library and found a doctor who cured me. Then, Mom **herself** went to medical school at age thirty-nine. (BTM)

The *-self* form appears largely because the writer knows that it is unusual and unexpected for a Mom to go to medical school, but that is indeed what happened. Emphatic *-self* pronouns often provide a warning to hearers that there is an unexpected situation regarding their referents.

3. REFLEXIVES AS ROLE CONFLICTS. Reflexive uses are an instantiation of this general tendency to use *-self* forms for unexpected messages. Among syntactically reflexive uses like those in (1) and (2), what is unexpected is that a single entity is playing more than a single role at just one time (Levinson 1991; Givón 1993; Kemmer 1995). For instance, in (1), *Martha saw herself*, the meaning of the word *see*, and the nature of vision, suggest two participants: someone who does the seeing, and something (or someone) that is seen. The typical situation is that these two participants are distinct. Sometimes, however, one entity plays both roles simultaneously: Martha saw and was seen, a situation we can describe as an unexpected conflict of roles. *-Self* pronouns offer a warning to hearers about this conflict, that there is an unexpected situation that requires some additional attention. This view of the function of *-self* pronouns will be called the Role Conflict Hypothesis; its claim is that *-self* forms can short-circuit a reader's natural expectation that there is a distinct second participant. Likewise in (2), *George talked to himself*. George has two roles in the talking: he talks, and is talked to. Of course, this is not the way we expect talking to be done.

The next example is illuminating because in it the choice between *himself* and *him* would not result in a different referential identity for the pronoun:

- (13) His career moved along typically: flight training in Texas and Florida and service on aircraft carriers in the Mediterranean. Then he entered test pilot training at Patuxent River, Md., elevating **himself** into the elite of military aviation. (NYT 7/3/98)

In this passage, the reader must infer the referent of the subject of the verb *elevating*. The *-self* form helps in this task, because it suggests that the referent played two roles in the event—here, the agent and the object. The same passage, with a simple pronoun in place of the *-self* form, is shown in (13)'.

- (13)' Then he entered test pilot training at Patuxent River, Md., elevating **him** into the elite of military aviation.

If the writer had chosen the simple pronoun, a reader would still correctly identify the form's referent, but might conclude that circumstances had caused him to be elevated to a higher rank—that just being in test-pilot training was itself sufficient for entry into the elite. In fact, the context for this example reveals that the writer did want to

distinguish between circumstances that simply unfolded (*his career moved along typically*), and those following the word *then*, which indicates a new phase in which the referent took action and was personally responsible for the path of his career.

4. EXCEPTIONS TO THE REFLEXIVE PRONOUN ACCOUNT. The strength of the Role Conflict Hypothesis is that it can also explain data that are anomalous for the structure-based Reflexive Pronoun account. For example, the passage in (5) was problematic for the reflexive account, because it contains a *-self* pronoun even though there is no additional mention of the referent within its clause. In that example, the referent of *himself* has a highly unusual dual role in a love affair. The use of a simple pronoun—which includes an affair with *him*—might lead the reader to conclude that there was an affair with a different man, someone mentioned previously in the discourse. In (5), the *-self* pronoun alerts the reader that the man is having an affair alone, that is, with himself. This affair involves a role conflict, because we expect people to have love affairs with other people.

Example (14) also contains a *-self* form that is suggesting a role conflict:

- (14) Wait, I said. You mean you're planning a one-man show about yourself, starring **yourself**? (BBN)

In a syntactic analysis, the understood subject of the verb *starring* would have to be *the show*. After all, a show stars its actors, but actors don't star themselves. But the conceptualization described here is that there is an unexpected role conflict for this referent—he is performing a one-man show that is about himself. One could posit as the understood subject of *starring a one-man show about yourself*, in order to satisfy the structural requirements of reflexivity, but this syntactic machinery of a lengthy, phonologically null underlying syntactic subject is not needed for the Role Conflict account.

4.1. PICTURE NOUN PHRASES. Picture noun phrases like the one in (6) have long posed difficulties for syntactic accounts of reflexivization. Picture nouns, like *story*, *photograph* and *portrait*, name entities that represent likenesses of other entities. It is well known that both *-self* and simple pronouns may occur in picture noun phrases to designate the same referents, as in (15) and (16).

- (15) John said there was a picture of **him** in the post office.
 (16) John said there was a picture of **himself** in the post office.

By definition, picture nouns all suggest the existence of a viewer, or a perceiver, of the likenesses they represent. Thus, there are at least two roles suggested by any picture noun: the entity portrayed, and the entity perceiving. In these sterile, decontextualized examples, *him* and *himself* appear to be largely interchangeable, as there is no evidence in the context to help explain the choice between the two forms, or to confirm the

analyst's intuitions about the differences between them. Rather than try to intuit the difference between invented examples, we can again consider authentic texts like (17):

- (17) The 'Enigma Variations' were first conceived humorously as a series of musical pictures of **himself**, his wife and people they knew. Coming home after a grinding round of teaching one Friday evening in 1898, he sat down at the piano and idly played a tune. His wife liked it and asked for it again. (CFP)

This passage tells us that the musical pieces were *conceived by* the referent of *himself*, so in the notion of the *musical picture*, the referent of *-self* is both the conceiver of the piece, and its subject.

By contrast, in (18), a simple pronoun is used in the picture noun phrase:

- (18) Celebrity chased him at Morgenthau's office as well. 'The first few days he was in the office we had people approaching us saying that a picture of **him** at his desk would be worth \$10,000,' says Michael Cherkasky, then the chief of the investigative-units division. 'You would be in the elevator with John and have police officers ask him for his autograph'. (PAB)

In (18), the referent of *him* has just one role with respect to the photograph: he is to be pictured in it. He need not see the photograph, or even be aware that it exists.

Kuno captured this observation with a hypothesis he called the Awareness Condition for Picture Noun Reflexives, which states 'the use of a picture noun reflexive is obligatory if the referent of the reflexive perceived/will perceive the referent of the picture noun as one that involves him' (Kuno 1987:179).

This Condition actually corresponds to the understanding of Role Conflict proposed here, in which the role of the perceiver is one of the distinct roles suggested by the noun. In our view, the choice between *-self* and simple pronouns is not based on a syntactic or pragmatic constraint; rather, the choice is based on the speaker's communicative goals. When a speaker wishes to suggest that a picture noun involves a single entity in more than one role, a *-self* pronoun is likely to be used; otherwise, simple pronouns are suitable. The choice between these two types of pronouns can also be seen in (19), in which the writer chose not to suggest that the referent of *him* has more than one role with respect to the picture:

- (19) For his part, Charles Walker says he endured racism at Los Angeles International Airport that was far from innocuous: rope nooses hanging in key parts of the building, a picture of **him** being used as a dart board, racist graffiti in a restroom. (SNR)

As further evidence that the occurrence of *-self* forms to refer to perceivers of picture nouns is not a syntactic phenomenon, the referent of *herself* in (20) is both a perceiver and a perceived, even though no structural picture noun phrase is present:

- (20) ...she shivered and wished she wasn't going to the sea: A picture rose clearly before her mind. Cyril's head, bobbing up and down, swimming to the rock... up and down—up and down... And **herself**, swimming in easy practiced strokes after him. (Lattey 1989)

4.2. LOGOPHORIC USES. Another well-known use of *-self* pronouns that poses a problem for the Reflexive Account is the logophoric use, shown in (7). Logophoric uses are those in which the referent of *-self* is the individual whose point of view is being represented, even though there is no overt clause-internal antecedent. In (7), the referent of *herself* is a character named Trudi. There is no potential antecedent mentioned elsewhere in the clause (*this time it was for herself*). It is Trudi's point of view that is represented. Trudi has been arrested and is hoping to win her freedom by recounting stories to her guard. We learn her inner feelings (a sudden rush of power), and what she was thinking (she had told stories before).

Logophoric uses are also at least partly explained by the Role Conflict Hypothesis, as there are at least two elements that are unusual: the perspective taken is not that of the speaker, and the referent of the form has more than a single role. The normal expectation in any discourse is that a speaker offers her own point of view. An utterance such as *Trudi felt a sudden rush of power* is the author's point of view of what the character felt. If a speaker wishes to deviate from that typical situation by expressing the point of view of a particular character, that is surely unusual and noteworthy. By definition, the referent of a pronoun used for a logophoric message plays at least two roles in an utterance: the role for which he is mentioned, and as the cognizer of the situation. The otherwise unexpected use of *herself* in (7) alerts the reader that there is something unusual about her: the thought (*this time it was for herself*) is not from the perspective of the narrator, but from Trudi's own point of view. In addition to the fact that the stories were for her, she is the cognizer of the situation. In this example, there is also a conceptual role conflict: Trudi is telling stories for herself.

4.3. SIMPLE PRONOUNS IN REFLEXIVE ENVIRONMENTS. What about simple pronouns in reflexive environments? These types of examples are one of the biggest challenges facing the Reflexive Pronoun account. Even though the lexical items in (21) and (22) are different, they appear to have the same syntactic structure, in which the pronoun refers to the subject of the sentence—the classic definition of a reflexive environment. These examples suggest once again that the choice between *-self* and simple pronouns is not based on syntactic considerations:

- (21) She carried an umbrella with **her**.
 (22) She bought flowers for **herself**³.

According to the Role Conflict hypothesis, *-self* pronouns appear when their referent is unexpected, while simple pronouns appear elsewhere. In (21), there is a natural inference that the referent of the simple pronoun *her* is the same person already mentioned

by the word *she*, because people usually **do** carry their own umbrellas. The inference is correct. By contrast, one usually buys flowers for someone else, such as a lover or a sick person. In (22) then, there is an expectation that the flowers were bought for someone else. The *-self* form blocks that inference, suggesting that there is something unexpected—the referent has more than one role in the event of buying flowers.

An illuminating pair of examples from Levinson (1991) is shown in (23) and (24). In both examples, the pronoun is coreferent with *John*:

- (23) John pulled the blanket toward **him**.
- (24) John pointed the missile toward **himself**. (Levinson 1991)

Levinson notes that the choice of a simple pronoun results in inferences that hearers are most likely to make. He explains that in (23) the most likely scenario is that *John* and *him* are coreferential, as John would have to be in an awkward position and performing an unusual action to pull a blanket toward someone else. By contrast, Levinson notes, the unexpectedness of John pointing a missile toward himself makes the use of a *-self* pronoun much more likely in this context. In the view proposed here, the *-self* pronoun is used in (24) to warn the hearer that the form's referent has two distinct and unexpected roles in this event.

In the next pair of examples, the *-self* form is used when its referent has a separate and unexpected role, while the simple pronoun occurs when the entity has no additional role, and her identity is not unexpected:

- (25) 'With the books, they can forget about **themselves** for awhile...' (HSR 162)
- (26) She had a wildness about **her**.

When X forgets about Y, one expects that X and Y will be distinct; however, it is difficult to imagine X having a wildness about someone other than herself.

4.4. *I DON'T RECOGNIZE ME*. Sometimes the *-self* pronoun is deliberately avoided in order to suggest the presence of two distinct participants, even though there is but one entity on the scene. In (27) we see an intriguing contrast between the use of *myself* and *me*. In each case, the pronoun's referent does indeed have two roles, but in the first instance, the *-self* pronoun is present, and in the second, it is not:

- (27) Says Mitnick: 'When I read about **myself** in the media, even I don't recognize **me**'. (PDH)

In this passage, a computer hacker is commenting on unsubstantiated stories that have been written about him in the *New York Times*. He uses *myself* to suggest a dual role: he is reading, and he is being read about. However, when Mitnick says *I don't recognize me*, he is deliberately evading the suggestion that he is playing two roles.

Instead, he is describing a situation in which it seems that there are two different entities being mentioned.

As grammarians have long noted, we find a scarcity of examples like (27) with third person pronouns. The Reflexive Pronoun account does not explain this observation, since first and third person sentences presumably don't have different syntactic structures⁴. However, from the pragmatic point of view of the Role Conflict hypothesis, this phenomenon is easily explainable: because the crucial information about the identity of a referent generally changes depending on whether an entity plays a single or a dual role in an event, speakers are less willing to deploy third person pronouns to achieve communicative results other than expressing the basic information of who did what. But the grammar of the language does not preclude this possibility.

When speakers are confident that hearers will have no difficulty identifying the intended referents, even in the third person, they may use (or avoid) *-self* pronouns for other communicative effects. The following example shows a third person simple pronoun used in this way. In (28), the speaker is tired and feels burdened by the constant care of her cantankerous elderly mother:

(28) DOCTOR TO 92-YEAR-OLD PATIENT: You're in excellent health. You'll live to be 150.

PATIENT'S DAUGHTER: Sure she will. She doesn't have **her** to take care of.
(RFS)

The message here is that the mother (*she*) will never be in the position the speaker is in, having to take care of a person like the mother. The speaker is describing the situation as if there were two different people involved.

4.5. WHAT ABOUT *SHE PRIDED HERSELF*? Examples like those in (29) and (30) would appear to provide evidence that the relevant generalization may, in fact, be syntactic:

(29) She prided **herself** on tolerance. (MFM 17)

(30) He behaved **himself**.

The flexibility to use simple pronouns for expected referents does not seem to extend to environments in which a direct object is coreferent with the subject of its clause. Clearly, the lexical items *pride* and *behave* lead to the expectation that the second participant will indeed be the same as the first, because one can't pride someone else, nor can one behave someone else.

In cases such as these, there is a grammatical source of role conflict for these referents. I am assuming the analysis described by Reid (1991) which hypothesizes that the order of words or phrases referring to participants in an event is a grammatical signal of meaning, in which the first participant mentioned is exerting Higher Control over the event, and the second participant is exerting Lower Control, as schematized in (31):

- (31) The kitten liked the dog.

C1

C2

c1 = Higher Controller (in a position before the verb) = *the kitten*

c2 = Lower Controller (in a position after the verb) = *the dog*

In (31), the kitten is a signal of Higher Control, while the dog, which occurs after the verb, is a signal of Lower Control, in the event of *liking*. There is an inherent conflict of roles when one individual has both a Higher Control and Lower Control role simultaneously⁵.

So, even the apparent syntactic requirement evidenced in (29) and (30) can be explained on the basis of the notional account described here. *-Self* forms appear where the communicative contribution they make is appropriate to a speaker's intended message.

5. A SEMANTIC VIEW OF THE DISTRIBUTION OF *-SELF*. The notion of role conflict is not simply a restatement of structural reflexivity. The role of the referent is not encoded by the *-self* pronoun, nor by a role conflict construction. Role conflict is an inference that may result from the speaker's use of a *-self* pronoun. And, most importantly, the empirical domain of role conflict extends more widely than the Reflexive Pronoun account.

Thus, what appears to be a syntactic rule (the use of *-self* in reflexive environments) can be explained by a semantic/pragmatic property of *-self*. Importantly, this property also accounts for the appearance of argument *-self* forms in other environments, including picture noun phrases and logophoric uses. The Role Conflict proposal offers a partial solution to an analytical problem that has never before been solved: what motivates the occurrence of *-self* forms in actual usage. It suggests that the choice between *-self* and simple pronouns in reflexive environments is based on communicative needs, not on syntactic considerations.

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² The complete analysis of *-self* proposed here is reported in Stern (2001).

³ Thanks to Joseph Davis for these examples.

⁴ See Ross (1970) for an early formulation of the proposal that sentences with first person pronouns actually do have different underlying syntactic structures.

⁵ It is beyond the scope of the research reported here to explain why lexical items like *pride* and *perjure* occur with two participants. For a discussion of the differences between examples like *he behaved* and *he behaved himself*, see Stern (2001).

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UNPACKING POLISH NARRATIVE

WILLIAM J. SULLIVAN
*University of Florida/
Uniwersytet Wrocławski*

DAVID R. BOGDAN
Matsuyama University

NARRATIVES, FACTUAL OR FICTITIOUS, constitute a major use of language in the real world. People decoding a narrative need to comprehend the meanings evoked by lexemes and the syntactic combinations they occur in. But as Gleason 1974 points out, they must also decode the narrative structure. Narrative structure in the present sense is the organization of the text into two main parts: one provides a picture of the universe of the narrative (the background in Hopper 1979) and the other is the plot, the sequence of events that tell the story (the foreground in Hopper 1979). It is, of course, the narrator's choice how to organize and present these sections. It is the listeners' task to sort them out by determining the function of individual clauses¹.

Our work with Russian and Polish (Bogdan 1984, Bogdan 1998, Sullivan & Bogdan 2002, Sullivan & Bogdan in press) has convinced us that the narrative function of a clause is communicated by the tense-aspect (T/A) form of the finite verb in the clause. In general, narratives can be cast in either past or present time. Each narrative time has a set of T/A forms that communicate narrative function consistently, enabling the listener to decode the narrative function of the clause and build up a picture of the narrative structure as the tale is told. Table 1 (overleaf) provides the unmarked T/A choices for each clause function in both narrative times.

In Table 1 (overleaf) *Plot* has its traditional meaning, the series of events that carry the story from its beginning to its end. *Pragmatic description* (PD) refers to the picture of the narrative universe. *Temporal background* (TB) clauses are subordinated semantically (and often grammatically) to clauses that may belong to Plot or to PD².

Assuming we are correct in our findings as summarized in Table 1, it should be possible to maintain narrative structure and the function of each clause. We attempted to test our description by getting native speakers to reconstruct a complex text from a text with all finite verbs presented as pairs of infinitives in both aspects. The results were mixed: on some predicates there was essentially total agreement with the original. In other predicates there was no more than 60% agreement with the original. We hypothesized that the mixed results resulted from individual choices as to the function of a particular clauses in the narrative. In our judgement, these choices were not unreasonable. But there was no way to test our judgement about individual choices. We needed another approach.

If the Table 1 description is accurate, the same narrative structure should be communicable in either a present- or past-time narrative. The present study is a report on such a test of our description of the original narrative structure in two ways. That is, we turned a past-time Polish narrative into a present-time Polish narrative and a

Narrative Time	Pragmatic Description	Temporal Background	Plot
Past	past imprf.	past prf.	past prf.
Present	pr. imprf.	past prf.	pr. imprf.

Table 1. Polish T/A forms and clause narrative function.

Level	Participants	Narrative time	Narrative Purpose
0	Narrator, audience	Moment of speech	Interaction
1	Narrator, Jola	Past time	Matrix story
2	Jola, little girl	Present time	Substory

Table 2. Semantic and formal characteristics of the text.

present-time Polish narrative into a past-time Polish narrative and adopted a procedure that would allow investigation of individual differences. It is, in short, cognitive and individual rather than statistical, though we had hopes of some possible statistical correlations. The cognitive results are positive, and there are indications that other, untested parts of our overall description are also valid.

1. THE TEXT. The text was produced by a female native speaker of Polish, a student of the Institute of Polish Philology at Jagiellonian University. She was asked to tell about something interesting that had happened to her. Bogdan and other students were present. Soon after she began talking, he turned on the tape recorder. Her story was transcribed from the tape with the assistance and advice of Dr. Halina Stephan of the University of Florida, also a native speaker. The resulting text is the 'complex Polish narrative' of Bogdan & Sullivan 2002.

The narrative itself is on three levels, which we call levels 0, 1, and 2. Level 0 has nothing to do with the tale narrated. It consists of comments to the audience, e.g. *wiesz* 'you know' or *ak, nie pamiętam* 'oh, I don't remember'. This is a real-time (moment of speech) text. As might be expected, all these verbs are present tense, imperfective aspect (pr.impf.). Level 1 is the story of the narrator's vacation at a campground on the Baltic coast. The central characters are the narrator and her cousin Jola. The narrator presented this story as a past-time tale. The distribution of T/A forms is in general as given in the past row of Table 1³. Level 2 is the story of the interaction between Jola and a little girl, who are its central characters. The narrator never participates in the level 2 text as anything more than an outside observer. She told this story as a present-time narrative. The distribution of T/A forms is as given in the present row of Table 1. That is, the T/A forms and the semantic content are tightly-yoked and together keep the three levels distinct. We summarize these facts in Table 2.

Level	Tensed verbs	Other	Comment
0	16 present	1 verbless	
1	43 past	1 present	Fact expressed
2	10 present	2 past	Past verbs = TB

Table 3. *Clause distribution in the test excerpt.*

2. THE TEST.

2.1 CHARACTERISTICS OF THE TEST EXCERPT. The first 72 tensed clauses of the text constitute the test. This excerpt begins with the introductory section of the level 1 and concludes with the full opening episode in the level 2 narrative. There are several level 0 interjections throughout as well. The excerpt is thus semantically coherent over all.

The exact numbers of clauses of each type are given in Table 3.

2.2. THE TEST VARIANTS. There were three variants of the text in the test. One was the original text, or as near to it as we could get with standard Polish orthography. One had the level 1 narrative changed from past-time to present-time. One had the level 2 narrative changed from present-time to past-time, according to the algorithm in Table 1. The original and the two altered variants were distributed in a 1::2::2 ratio. That is, there were 11 originals and 22 of each of the modified texts returned.

One further modification was made to half of the texts in which the level 1 narrative was redone as a present-time narrative. One of the pre-test subjects suggested that the level 0 clauses were a serious distraction and should be removed. Either that or a whole section of the text (and he correctly indicated the level 1 portion of the original) should be redone as a past-time narrative. He didn't know Sullivan had rewritten this portion from a past-time narrative. We return to his comments in section 5. Because of the cogency of his emendations, we followed his suggestion. The level 0 clauses were deleted from half of the tests with the level 1 narrative recast in the present tense.

2.3. THE SUBJECTS. The subjects were all students of English at the Instytut Filologii Angielskiej of Uniwersytet Wrocławski, ranging in age from 20 to 35 with a median age of 25. There were 55 total⁴ with 40 female and 15 male subjects. The F/M ratio is representative of the IFA population. The subjects had to be fluent in English, so that instructions could be given in English, avoiding any possible prejudicial use of aspect by Sullivan.

There were three groups of subjects. The fifth-year students of cognitive semantics knew absolutely nothing about the test or about or hypotheses. They constitute the group we refer to as 'In the Dark' (ItD). The fourth-year MA seminar (MAS) knew we have a theory about tense, aspect, and Polish narrative, but they didn't know what it is. The third-year contrastive grammar students were completely 'In the Know' (ItK). They not only knew what our theory is, but they had seen the original text approximately six weeks before taking the test. The distribution of students is given in Table 4.

	F	M	Σ
ItD	22	8	30
MAS	13	4	17
ItK	5	3	8
Totals	40	15	55

Table 4. *Subjects by sex and preparation.*

We do not include the distribution of areas of specialization (literature/linguistics) because this classification does not reflect the wide variety of preparatory proseminars taken.

2.4. THE INSTRUCTIONS. The subjects were told that they were receiving an excerpt from an oral narrative in written form. They should read the text and indicate anything they didn't like. Any questions? Different students asked if they could delete words, change words, rewrite. To each question Sullivan answered, 'If you like.'

There was a second part to the test. On the back the subjects were asked to write a short summary of the text in Polish and state whether they looked back at the front in the process. They were told that it made no difference whether they looked back at the text, but we did want to know. In addition, if they were willing to discuss their test, they were to sign the paper. All but two did.

2.5. DISTRACTORS. With the instructions given, there are many potential corrections that distract from the part of narrative structure supplied by verbs. These include frequent repetitions of *właśnie* 'right' as an interjection, false starts, etc. Beyond noting that the distractors were effective for almost all subjects, we ignore them. They make no contribution to the narrative structure in general.

2.6. PREDICTIONS. There were two statistical predictions in our initial thinking. First, our work with Russian subjects suggested that neither sex nor age would play a role here. Second, we expected that the difference in preparation would not. We made these predictions because the knowledge of tense and aspect and their functions is acquired before children get their first grammar lesson, and except for its lexical variants, aspect is not part of the grammar books used in Russian or Polish schools. Moreover, native speakers are often unable to tell the aspect of a particular verb out of context and most dictionaries are not consistent in their designation of aspect. We expected no difference in corrections as a function of preparation and a willingness on the part of the subjects to rewrite the originals as well as the variants⁵. We expected more corrections on those texts in which the level 1 narrative is recast in the present and that recasting the level 2 narrative in the past would evoke little difficulty.

	Or	Pr1	Pr2	Pa	T	Σ_4	%
ItD	2	1	0	1	4	30	13.3
MAS	1	3	1	5	10	17	58.8
ItK	0	1	1	1	3	8	37.5
T	3	5	2	7	17	55	30.9
#tests	11	13	9	22	55		
%	27.2	38.5	22	31.4	30.9		

Table 5. *Papers without changes.*

3. RESULTS

3.1. FOCUS. Our focus here is the individual understanding of Polish narrative structure as coded in verbal tense and aspect. We therefore ignore anything that does not involve a verb. Many types of corrections made by different subjects are ignored. These include the deletion of a subject pronoun where verb agreement provides the same information, making the pronoun redundant; the deletion of redundant adverbs and false starts; etc.

This ignores the vast majority of corrections made. But it leaves three types of relevant papers. One type is the papers with no change that affects a finite verb. The two others involve the deletion of redundant verbs and ‘other’ changes. We take each type of change in turn.

3.2. NO CHANGE. Seventeen papers were returned without any changes that affect the finite verb. The breakdown is given in Table 5. Column **Or** records the number of subjects with the original text. Columns **Pr1** and **Pr2** record the number of subjects with level 1 narrative changed to a present-time narrative. Pr2 papers lacked the level 0 clauses. Column **Pa** records the number of subjects with the level 2 narrative changed to a past-time narrative. T presents the totals for each column and row. Σ_4 is the sum of subjects from Table 4.

Two subjects, one from ItD and one from ItK, wrote comments that as a written text it requires much editing, but they made no changes because it represents the way people actually speak. Two wrote comments that the entire text should be rewritten. One of the four had an original.

3.3. REDUNDANT VERBS DELETED. There were 24 papers returned with redundant verbs deleted. The breakdown is given in Table 6 (overleaf). The numbers in parentheses refer to the number of subjects. All other numbers refer to the number of verbs deleted. In Table 6 **TD** stands for total deletions and **D/S** stands for the average number of deletions per subject.

3.4. OTHER CORRECTIONS. There were twenty papers that had changes involving emendations of some sort or had marks whose significance was not immediately

	Or	Pr1	Pr2	Pa	TD	Σ	D/S
ItD	20	20	7	22	69	(17)	4.05
MAS	8	8	0	0	16	(3)	5.33
ItK	10	0	6	6	22	(4)	6.00
TD	38	28	13	28	107	(24)	4.54

Table 6. Deletion of redundant verbs.

	LC	Typ	Tns	Asp	T/A	FC	?	Σ
ItD	5	1	3	1	2	5	3	13
MAS	4	2	0	1	2	1	1	5
ItK	3	0	0	1	0	2	3	2
TC	12	3	3	3	4	8	7	20

Table 7. Other changes (emendations, etc.). Where:

- LC = lexical change
- Asp = aspect
- Typ = typographical error
- ? = various changes
- Tns = tense
- T/A = tense & aspect
- FC = functional change

clear. The subjects who produced ‘other’ corrections were interviewed, and their answers are assigned to the appropriate columns in Table 7⁶.

4. DISCUSSION. The individual cognitive question we address here is whether the discourse structure we adduce and the morpholexical signals by which it is communicated ring true to native speakers. To the extent that the handwriting could be deciphered, the summaries show a full understanding of the test text in all its variants. This includes both the matrix story and the substory. The comments to the audience were uniformly ignored in the summaries Sullivan could actually read. This is a lack of evidence, to be sure, but it is suggestive: there is no counter-evidence. If it is exceptionless, a claim we cannot make because of illegibility, it is conclusive. It may be possible to reconstruct what was written with the help of returning students. But without this close reading, it remains only suggestive. However, there are some inferences that can be drawn from individual papers. We turn to them now.

4.1. NO CHANGES. Clearly the seventeen subjects who made no changes in the text but still wrote coherent summaries had no problem with the structure of the text. Again this provides no direct evidence in support of our description. But it also provides no counter-evidence.

4.2. REDUNDANT VERB DELETION. The important thing about redundant verbs is that deleting them does not affect narrative structure. Eighteen subjects deleted redundant

verbs and made no other changes. Again, this result provides no counter-evidence to our description.

There are some interesting facts that emerge from Table 6. In a sense, all comments to the audience (level o) are redundant. They are unnecessary to the narrative and could all be deleted. In fact, variant Pr2 lacks the level o clauses. Only a total of thirteen deletions were made by the nine Pr2 subjects. Conversely, the eleven subjects with the original text (including all the level o clauses) made 38 deletions. As there were only 11 level o clauses with finite verbs, the Or subjects deleted 16 more redundant verbs than the Pr2 subjects. Another interesting fact is that at least two subjects did not delete redundant verbs but did make 'other' changes. No trends emerge from Table 6, however, and we say no more about it.

4.3. 'OTHER' CHANGES. The subjects who made 'other' changes were all interviewed. They were asked to reread the clauses in question. If they had merely marked the verb or clause, they were asked what change they would make. Then they and the subjects who had made clear emendations were asked what difference in the information communicated resulted from their changes. Their answers determined the classifications that appear in Table 7. We take the columns from Table 7 in order.

Lexical changes accounted for 12 verbs. In each case the tense and aspect of the original verb was replicated. This results in a preservation of the original narrative function of the clause. Our inference is that the narrative structure was correctly perceived.

The typographical error mentioned was on the Pr1 and Pr2 texts. Sullivan changed a plot verb of the level 1 narrative from past to non-past tense without deleting the perfectivizing prefix. Both researchers, all who took the pre-test, and 19 of 22 subjects who received this text missed the error; 3 noted it. One changed the aspect, making the verb consistent with the present-time narrative. One changed the tense to past; during the interview this subject said he didn't like present-time narrative. The third merely circled the verb and said in the interview that it had to be either past tense or imperfective. Again, narrative function was preserved in one of the two possible ways. Again, we infer that the function of the clause in the narrative was correctly perceived.

One change in aspect goes back to the typo and is covered above. There were two other changes in aspect. These two were on the first of a repeated plot verb (past prf.) in the level 1 narrative ('we returned from the pier'). Both subjects justified themselves by saying that the aspect was changed to imperfective, because 'the action wasn't yet complete at that point'. This is a marked use of imperfective aspect (cf. Sullivan & Bogdan 2002), which we were not trying to test. Yet the form supplied is exactly what our system predicts is a possible choice in this context. That is, the subject validated another part of our description.

There were also two changes in tense. One of these was on a present imperfective verb in a PD clause of a Pr1 test. The subject said she didn't like present-time narratives and changed the tense. But then she realized how many verbs would have to be changed and gave it up. The other change in tense involved a marked use of present in

level 1 narrative to describe a fact true at the time of the narrative and still true at the moment of speech: 'she didn't know that we *are* the owners of the tent.'

There were two cases in which both tense and aspect were changed on plot verbs in the level 2 text of the original: present imperfective was shifted to past perfective. The clauses were, in effect, shifted to the level 1 narrative, but the clause function was preserved. These clauses were at the point where the level 2 narrative shifts back to the level 1 narrative. This change is consistent with the Table 1 system. It only shows that the boundaries between the level 1 and 2 narratives are not rigid and are also subject to narrator choice. Again we infer that the narrative structure was correctly perceived. The location of a boundary was tacitly disputed, suggesting the importance of narrator choice.

There were eight functional changes, some also involving shifts of clauses from level 0 to level 1 narrative. Four comments to the audience were shifted to PD clauses on level 1 by simply making them past tense. Two of these were on original papers, two on papers with level 2 narrative rewritten in past. The four other functional changes are more interesting. Two subjects said they were rectifying a non-parallel construction involving a subordinated TB (past prf.) clause and a PD (past imprf.) clause. Once the TB verb was shifted in aspect, making both clauses PD in function. The other time the PD verb was shifted in aspect, making both clauses TB in function. The grammatical subordination is thus wiped out, though the semantic subordination of the TB clauses remains, as they are in the middle of a PD passage. The last functional change involves TB clauses in a Pr2 variant. They were subordinated to a plot clause (pr. imprf.) in the text. This makes them part of the plot but not part of the central plot line. The subject changed both TB verbs to present imperfective, keeping them as part of the plot but making them part of the central plot line. There are two inferences here. First, the subject correctly perceived the relation between T/A form and the structure of the narrative. Second, he did not agree with the narrator's choice here.

In short, the interviews tell us that all changes are consistent with the Table 1 system.

Of the unclassified changes, one involves the addition of a TB clause subordinated to a plot clause. The TB clause added has a past perfective verb, consistent with the Table 1 system. The other unclassified changes are all stylistic ('too many adverbs', 'the original verb can't be used that way'). They do not affect our description and provide no counter-evidence to it.

5. CONCLUSIONS. This test was devised to permit an individual cognitive test of our description of the narrative function of tense and aspect in Polish, using a complex, spontaneously-produced text. Unlike our previous test, which was statistical and collective, this one incorporated extensive individual feedback. When there were subject responses that diverged from what the description in Table 1 predicts, we were able to determine the reasons for those differences. There was no counter-evidence to our description. Moreover, everywhere that responses differed from what Table 1 predicts,

the subject's individual responses showed interpretations of the narrative text that match the responses they produced, according to Table 1.

In devising a psychological test there is always the danger of testing only the null hypothesis. The total lack of any counter-evidence to our description here might be due to such a failure. But it is also possible that we have correctly tapped into something that is so deep in the linguistic system of native speakers of Polish that our predictions are accurate. We repeat: it is something native speakers acquire early in life, before their first grammar lesson. It's a good thing they do, as Polish grammars do not explain the function of aspect in texts. Of course, this may be because there is no need to. Native speakers of Polish 'know' it and how to use it the same way native speakers of English 'know' the definite article and how to use it. In neither case can the native speaker explain the corresponding functions and usages in any coherent fashion. One of the indications of this came from the most diligent editor of the pre-test. He had a Pr1 variant and said that one of the present-tense verbs (*daje* 'she gives') should be in the past. This was a plot verb. Sullivan asked what form of the past tense should be used and he responded with *dala* 'she gave'. This is a past perfective form, as Table 1 predicts. Sullivan said, 'You not only changed the tense, you changed the aspect, too'. Somewhat embarrassed, the colleague said, 'I wasn't aware of that'. This is one facet of the problem we face. Table 1 is part of our solution to the problem.

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- ¹ This binary division of texts does not suffice in Slavic.
 - ² TB clauses constitute the numerous exceptions to Hopper's foreground-background distinction for past-time narratives. Hopper 1979 does not deal with present-time narratives. For an explanation of the uses of T/A forms in the narrative, cf. Sullivan & Bogdan 2002.
 - ³ There is a marked use of present tense. We return to this in section 4.
 - ⁴ A disappointing total: 100 students were scheduled to fill out the test. Most of the groups were too small for statistical reliability. Statistical correlations were not the main goal of this test, but it would've been nice to do some. The unstudied and unreported part of the test might still provide some reliable correlations.
 - ⁵ Russian native speakers are willing to rewrite Alexander Pushkin and Vasilij Nekrasov, sometimes blaming Sullivan (1994) for what they considered to be errors in the text.
 - ⁶ Neither of the two subjects unwilling to discuss their answers had 'other' changes.

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THE GRAMMATICALIZATION AND LEXICALIZATION OF THE PRAGMATIC MARKER *GĚI WO* IN MANDARIN

JUNE C.C. SUN
Providence University

BOTH GRAMMATICALIZATION and lexicalization are processes of language change. The two processes codify language materials in different ways—when grammaticalization occurs, a new member is added to the grammar of a language; when lexicalization takes place, a new lexeme is recruited to the lexicon. However, when an item is grammaticalized as a function word, a new member is also added to the lexicon, i.e., this type of grammaticalization is lexicalization. Each process brings changes to a language at different levels. By investigating the pragmatic marker *gěi wo*, whose literal meaning is ‘give me’, in Modern Mandarin, this paper presents the grammaticalization and lexicalization of *gěi wo* to see 1) how grammaticalization paves the way for lexicalization, and 2) how the emergence of the pragmatic marker *gěi wo* is an instance of grammaticalization as well as lexicalization.

Gěi ‘give’ and *wo* ‘me’ are frequently collocated for interpersonal purposes. *Gěi* grammaticalized and became a dative preposition meaning ‘for’. Thereafter, due to the high frequency of use, *gěi wo* developed into a pragmatic marker as an emphatic device. According to Brinton (1996), the emergence of a pragmatic marker is an instance of grammaticalization. Thus, *gěi wo*’s becoming a pragmatic marker is grammaticalization. However, the appearance of *gěi wo* as a pragmatic marker is an addition to the lexicon. Thus, it is also lexicalization. Moreover, *gěi wo* is further lexicalized and is used as a lexical unit marking displeasure. Both grammaticalization and lexicalization occurred during the development of *gěi wo* and gave rise to its usage today. This paper shows that grammaticalization and lexicalization are inseparable in the development of a language.

1. THE USE OF *GĚI WO* ‘GIVE ME’ IN MODERN MANDARIN. Change of intonation is one major way for speakers to give emphasis. In Modern Mandarin, *gěi wo* ‘give me’ is a common phrase in daily conversation. An object is usually followed by the verbal phrase *gěi wo*. For instance, *gěi wo yi ben shu* ‘Give me a book’. Besides, the verb *gěi* ‘give’ was grammaticalized as a dative preposition meaning ‘for’. Hence, the phrase *gěi wo* also serves for the meaning of ‘for me’ as it precedes another verbal phrase. For example, *gěi wo dai yi ben shu lai* ‘Bring a book for me’. In addition to functioning as a dative preposition, when *gěi* is collocated with the first pronoun *wo* ‘I’, an imperative, a warning, or a displeased reading comes out in certain contexts. *Gěi wo* has been grammaticalized as well as lexicalized and has become a common pragmatic marker to give orders/warnings and express displeasure. Its presence or absence does not affect the grammaticality from utterances. If *gěi wo* as an emphatic marker is omitted

in utterances, the strength of the utterance is diminished. Examples with *gěi wo* and without *gěi wo* are shown in the following subsections.

1.1. *GĚI WO AS A DEVICE TO ENHANCE AN ORDER.* Different ways can be used by a speaker to express an order; for instance, to raise one's voice or to speak with a powerful intonation. *Gěi wo* is a frequently used emphatic device in giving orders. Speakers at any age and of any gender could use *gěi wo* to strengthen the orders they give.

- (1) *Chi fan!*
eat rice
'Eat!'
- (2) *Ni gěi wo chi fan!*
you give me eat rice
'Eat!' (a stronger voice)

The meanings of (1) and (2) are the same and both are imperatives. If (1) is said in a gentle way, it is merely an imperative. That is, the speaker simply requests the hearer to eat. The hearer might not feel anything unpleasant. However, the addition of *gěi wo* makes the utterance more direct and impolite. To a large extent, (2) has much stronger voice expressing the anger or the emphasis of the speaker. (2) might appear in the situation that a child does not eat his lunch and his mother orders the child to eat the food. The use of *gěi wo* is to emphasize the order she has just given.

1.2. *GĚI WO AS A DEVICE TO BOOST A WARNING.* *Gěi wo* is also used in warnings. If there is friction between two persons, one of them might give a warning to the other to reveal his anger or his possible intention of seeking revenge. The following examples provide a comparison between using and not using *gei wo*.

- (3) *Ni xiao xin yi dian.*
you small heart one point
'Be careful; Watch out!'
- (4) *Ni gěi wo xiao xin yi dian.*
you give me small heart one point
'Watch your back!'

It can be the situation that the hearer has said or done something harmful or unpleasant to the speaker. Thus, the speaker shows his/her intention of taking revenge in the future by giving a warning. In (3), the speaker has to use a stern or cold voice to achieve the purpose of giving a warning. The connotation of warning might be gone in (3) because *gěi wo* is absent from the utterance. Only when speaking with a harsh voice does the reading of warning emerge. However, the use of *gěi wo* in a warning

does not have to be accompanied by a stern or cold voice. It is apparently a warning by virtue of *gěi wo*'s presence.

1.3. *GĚI WO* AS A MARKER OF DISPLEASURE. In addition to using *gěi wo* as a marker of impoliteness in giving orders and warnings, speakers also use *gěi wo* to express displeasure or dissatisfaction with somebody. The following example can be addressed to hearers or said behind the back of a person the speaker is displeased with.

- (5) *Ni/ta zai juchang he kele.*
 you/he at theater drink cola
 'You/He drank a cola at the theater.'
- (6) *Ni/Ta gěi wo zai juchang he kele.*
 you/he give me at theater drink cola.
 (How can) you/he drink a cola in the theater!

(5) and (6) can be a situation that someone drank a cola at a theater, which is against the rules of the theater. In (6), the speaker uses *gěi wo* to show his displeasure at the act of drinking in a theater. *Gěi wo* here is no longer an emphatic marker; it is a marker of displeasure. It is a marker to indicate the displeasure or dissatisfaction of the speaker toward the hearer. However, the absence of *gěi wo* in (5) makes the utterance simply a declarative. Without *gěi wo* as an indicator of the speaker's displeasure, outsiders cannot be sure whether the speaker is blaming the person who violates the rule.

For the imperative usage, *gěi* always requires a following first-person pronoun. The constructions with other person pronouns have not acquired the same function. *Gěi wo* is automatically omitted from the restatement by other speakers. That is, the first pronoun *wo* has never been replaced by other pronouns to retain the original speaker's voice. The examples of original utterance and the restatement by others are shown below:

- (7) a. *Ni gěi wo zuo gongke* (the original utterance)
 you give me do homework
 'Do your homework!'
- b. *Ta mingling tade erzi zuo gongke* (the restatement by others)
 she order her son do homework
 'She ordered her son to do his homework.'
- c. *Ta mingling ta erzi gei ta/ni zuo gongke.*
 she order her son give him/you do homework
 i. 'She ordered her son to do homework for him/you.'
 ii. 'She ordered her son to let him/you do homework.'

(7)a is a statement by others. However, the replacement of the pronoun by *ta* 'him' or *ni* 'you' is not considered to include an emphatic device. That is, *gěi ta/ni* 'give him/you' gives rise to another meaning, as shown in (7)c.

The uses of *gěi wo* in the above mentioned situations reveal the unpleasant emotions of the speaker. *Gěi wo* is seldom used in formal texts; however, it is frequently heard in casual conversation, as an impolite and aggressive utterance. It usually appears at the beginning of an utterance with stressed intonation. When *gěi wo* is taken away from the utterance, the logical meaning of the entire utterance will not be changed. *Gěi wo* as a pragmatic marker does not act as a syntactic unit but as an intensifier.

2. GRAMMATICALIZATION AND LEXICALIZATION. Grammaticalization is a gradual and continuous process whereby a concrete word becomes abstract and thus shifts into different categories (Heine et al 1991). Lexicalization has been discussed by a variety of viewpoints. It is by and large considered a process that transfers functional items into lexical ones (Wischer 2000). However, lexicalization is often regarded as a counterexample of grammaticalization (Traugott & Heine 1991). This view implies that the two processes are separate in the developments of languages. Grammaticalization and lexicalization are sometimes viewed as two complementary processes. It is said by Cabrera (1998: 214, 218) that grammaticalization 'feeds syntax and bleeds the lexicon' and lexicalization 'feeds the lexicon and bleeds the syntax.'

The above viewpoints consider grammaticalization and lexicalization are independent from each other—when grammaticalization happens, lexicalization does not occur; when lexicalization takes place, grammaticalization does not arise. We adopt a different stance about the relationships between grammaticalization and lexicalization.

Heine (1991) sees words changing from an open into a closed class as an instance of grammaticalization, but Anttila argues this is also lexicalization: 'When an adverb splits off from a noun, it has to be learned separately and is thus a new lexical item. Whenever a linguistic form falls outside the productive rules of grammar it becomes lexicalized' (1989:151). We adopt this approach as well. Whenever a linguistic item is recruited as a grammatical one, this item is grammaticalized. Whenever there is an item whose meaning and function are different from its primitive ones, a new lexeme is added to the lexicon of a language. However, when a unit is grammaticalized, its function and meaning are also different from its previous ones. Speakers have to learn the use of this item. This item is an addition to the lexicon of a language. This is lexicalization. Therefore, a linguistic item undergoes the processes of grammaticalization and lexicalization at the same time. The only difference is that the two processes operate at different levels in the development of a language. Grammaticalization is an addition to existing grammar, while lexicalization is an addition to the lexicon (Katz 1998; Katz & Sun forthcoming). The formation of the new grammatical unit does feed the syntax, but it does not bleed the lexicon. Likewise, the formation of the new lexical unit does not bleed the syntax while it feeds the lexicon. The two processes co-occur but function at different levels during the development of a language.

The most common method of word formation in Chinese is the lexicalization of two independent lexemes into one semantic unit (Packard 1997). Packard (2000) categorizes five different types of lexicalization in Chinese according to the occurrence

category	lexicaliza- tion type	word component meaning	grammatical identity of relations	examples
1	conventional	full	present	<i>pa-chong</i> crawl-insect 'reptile'
2	metaphorical	metaphorical	present	<i>dian-ying</i> electric-shadow 'movie'
3	asemantic	opaque	present	<i>wen-shi</i> ask-world 'to be published'
4	agrammatical	full or meta- phorical	absent	<i>xue-jiu</i> study-research 'pedant'
5	complete	opaque	absent	<i>ya-gen</i> pressure-root 'completely'

Table 1. *Categories of lexicalization.*

of the semantic and grammatical reduction in a word. Table 1 is quoted from Packard (ibid: 222).

In the following sections, the lexicalization of *gěi wo* will be categorized based on the five types of lexicalization suggested by Packard. The grammatical and semantic relationship between *gěi* and *wo* will be discussed to show that it is an instance of lexicalization. On the other hand, whether the emergence of *gěi wo* is an instance of grammaticalization will also be discussed according to the criteria proposed by Brinton (1996).

3. THE DEVELOPMENT OF *GĚI WO*. In the following, the development of *gěi wo* presents how grammaticalization and lexicalization intertwine with each other. We will see how grammaticalization paved the way for lexicalization and how the two processes occur at the same time but at different levels. In order to show this point, the discussion has to start from the development of *gěi* 'give'. Moreover, it will also be shown how the collocation of *gěi wo* became a pragmatic marker for interpersonal communication.

Chinese verbs can be reanalyzed as prepositions. In terms of syntactic structures, *gěi* sometimes appears as the first verb in the serial verb constructions. Once the major concern focuses on the second verb, *gěi* gradually loses its semantic significance and is regarded as a preposition meaning 'for'. The reanalysis of the syntactic structure is the mechanism that activates the grammaticalization of *gěi* from a verb to a dative preposition (Sun 2002). Figure 1 (overleaf) displays the reanalysis of *gěi*.

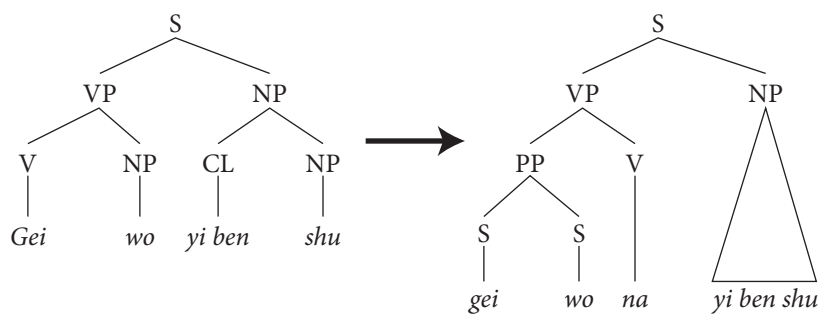


Figure 1. The syntactic structures of gěi as a verb ‘give’ and as a preposition ‘for’.

Functions	Examples
<i>gěi</i> ‘give’ verb	298
<i>gěi</i> ‘for’ dative prep.	31
<i>gěi wo</i> ‘give me’	57
<i>gěi wo</i> + V.	6
<i>gěi wo</i> in orders or warnings	0

Table 2. The use of gěi wo in the novel of Xingshiyinyuan (17th century; 757,693 words).

As a dative preposition, *gěi* is often used with pronouns, such as *gěi wo* ‘for me’, *gěi ni* ‘for you’, and *gěi ta* ‘for him’ for interpersonal purposes.

In the book of *Xingshiyinyuan*, a novel written around the middle of the 17th century, *gěi* and *wo* were still two independent lexemes for the meaning of ‘give me’. They were not yet used as a pragmatic marker to strengthen one’s voice. However, *gěi* already served as a dative preposition. The following table shows the frequency of *gěi*’s as a verb, a preposition and the collocation of *gěi* and *wo* in the book.

There were 57 examples of the collocations of *gěi* and *wo*. Only 6 examples of the construction of [[*gěi wo*] + V] are found in the book. None of the examples was used denoting any orders or warnings. However, *gěi* was already used as a dative preposition. That is, the verb *gěi* grammaticalized into a preposition before the emergence of the pragmatic marker *gěi wo*.

Before the end of the 18th century, *gěi wo* as a pragmatic marker appeared. There were 13 examples out of 36 *gěi wo* ‘for me’ for giving orders. None of the examples were used for giving warnings or expressing the displeasure of the speaker. Table 3 presents the frequency of the appearance of *gěi wo* in the book of *Hongloumeng*, the *Dream of the Red Chamber*.

The above two tables indicate how *gěi* as a verb developed into a dative preposition. Over time, the collocation of *gěi* and *wo* became conventionalized and was used as a

Functions	Examples
<i>gěi</i> 'give' verb	619
<i>gěi</i> 'for' dative prep.	181
<i>gěi wo</i> 'for me'	36
<i>gěi wo</i> in orders	13
<i>gěi wo</i> in warnings	0

Table 3. *The use of gěi wo in the novel of the Dream of the Red Chamber (Before the end of the 18th century; 866,334 words)*

device to give emphasis. Nowadays, the use of *gěi wo* as an emphatic device in giving orders/warnings and expressing displeasure in Modern Mandarin is commonplace.

Newman (1996:199) cites *gěi wo*'s imperative usage as 'a kind of benefactive.' Thought to originate from the benefactive reading, *gěi* in the imperative phrase *gěi wo* is a dative preposition. In Example (2), the meaning of the sentence is not 'you eat rice for me'. It is the hearer *ni* 'you' who is ordered to eat the rice by the speaker *wo* 'I'. *Gěi wo* is a pragmatic marker functioning as an intensifier to the voice of the speaker. Brinton (1996:33–34) suggests that pragmatic markers display these features:

- a. a feature of oral rather than of written discourse
- b. appearing with high frequency in oral discourse
- c. having little or no propositional meaning
- d. having no clear grammatical function
- e. being optional rather than obligatory

The colloquial characteristics of *gěi wo* are in line with Brinton's ideas; its absence never makes a sentence ungrammatical or unintelligible but somehow removes a powerful emphasis. In other contexts, *gěi wo* still retains its literal meaning and primitive function; that is, 'give me'. Only when a speaker gives orders or warnings or expresses displeasure does *gěi wo* function as a pragmatic marker strengthening the speaker's voice.

Is *gěi wo* a grammaticalized unit? We view *gěi wo* as a grammaticalized form. Its unique pragmatic force comes out exclusively in orders or warnings, which is a phenomenon of 'context-induced reinterpretation' common in grammaticalization. Its lexical meaning is bleached, and while bleached as an emphatic device, lexical earmarks of *gěi wo* 'give me' remain in other contexts as two independent units. This is layering and divergence, two characteristics of grammaticalization. Those aforementioned phenomena *gěi wo* exhibited indicate it as an instance of grammaticalization, in which high-frequency use is a primary factor. *Gěi wo* frequently appears when the speaker and hearer interact during transfer of a given entity. Metaphorically, the transferred entity can be a request or command, with the hearer requested to carry

out the act ('eating' in Example 2) for a certain benefit of a speaker. This phrase is used whenever there is interaction with the transferred entity between two parties; that is, *gěi wo* is of frequent and general use. Hearer and speaker both realize the purpose of *gěi wo*; it thereby becomes conventionalized, signifying orders or warnings or conveying displeasure of the speaker.

Lexicalization involves compounding and idiomatization. Original syntactic structures progressively lose their compositionality. The collocation of *gěi* and *wo* forms a compound-like phrase. When *gěi wo* is used as a pragmatic marker, it never appears independently in utterances; i.e., it always comes out before a verbal phrase and functions as a modifier to the voice of the speaker. *Gěi wo*'s usage has been conventionalized. The collocation of *gěi* and any other pronouns never forms a pragmatic marker or carries out similar functions.

According to Traugott (forthcoming), the most general sense of lexicalization 'concerns the relation between a set of elements in conceptual structure and a lexeme'. DO WHAT I WANT YOU TO DO is lexicalized as *gěi wo*. Examples are listed again below to see the degree of *gěi wo*'s lexicalization.

- (2) *Ni gěi wo chi fan!* 'You eat (the rice because I want you to eat!)'
- (4) *Ni gěi wo xiao xin yi dian!* 'You watch out your back (because I will seek revenge!)'
- (6) *Ni gěi wo zai juchang he ke!* 'You drank a coke at the theater! (I am very annoyed or rather angry about it.)'

There is a semantic shift in (2) and (4) from 'for me' to 'because of me'; to be specific, the *gěi wo* in (2) implies that the order of *ni gěi wo chi fan* 'You eat!' has to be completed for the sake of the speaker. The *gěi wo* in (4) implies the hearer has to be cautious because of the speaker's warning. According to the types of lexicalization proposed by Packard, *gěi wo* in (2) and (4) can be categorized into conventional lexicalization. That is, they are weakly lexicalized since the grammatical and semantic identity of the components *gěi* and *wo* is somehow retained. It is conventional to use *gěi wo* to emphasize the speaker's orders or warnings. Furthermore, the meaning of *gěi wo* in (6) changes again. The hearer does not have to do what the speaker ordered or have to be careful because of the warning from the speaker. The implication of 'for/because of the speaker's sake' is entirely vanished. Speakers utilize *gěi wo* as a marker to emphasize their displeasure with someone. Therefore, *gěi wo* in (6) is considered an agrammatical lexicalization. That this is so is proved by the impossibility of substituting other persons for the first person pronoun.

4. CONCLUSION: GRAMMATICALIZATION AND LEXICALIZATION AS TWO INSEPARABLE PROCESSES. This paper demonstrates the co-occurrence of grammaticalization and lexicalization in the development of the pragmatic marker *gěi wo*. Originating from

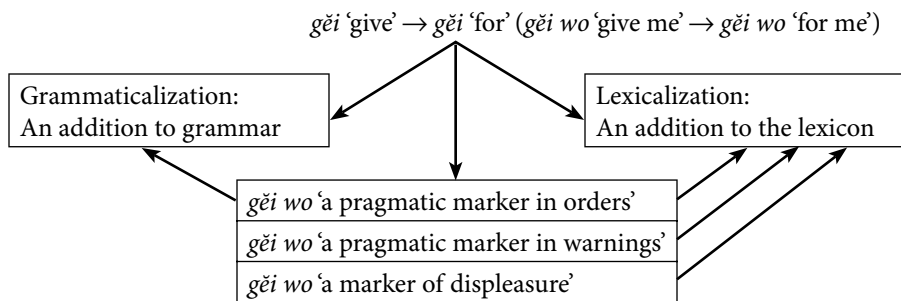


Figure 2. The grammaticalization and the lexicalization of gěi wo.

a lexical verb 'give', gěi grammaticalized as a preposition, a function word. The prepositional phrase gěi wo 'for me' became a pragmatic marker to emphasize the speaker's voice. Furthermore, it was lexicalized as a marker to indicate the displeasure of the speaker towards an event or a person. The overall development of the pragmatic marker gěi wo is shown in Figure 2.

The grammaticalization of the verb gěi paved the way for the appearance of the pragmatic marker gěi wo. In addition, we see that both grammaticalization and lexicalization occurred during the emergence gěi wo as a pragmatic marker. They operate at different levels of the language—the former is at the grammatical level whereas the latter is at the lexical level. They are inseparable processes in the development of the pragmatic marker gěi wo.

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CLUSTERING OF SPEECH ERRORS

JASON WELLS-JENSEN & SHERI WELLS-JENSEN
Bowling Green State University

MODELS OF THE SPEECH PRODUCTION SYSTEM are often tested against data drawn from speech errors, or slips of the tongue (Fromkin 1973). Such errors may be collected one by one from naturally-occurring speech, or they may be elicited more quickly under controlled conditions in the laboratory (Stemberger 1985). Within both research paradigms, however, speech error data are typically collected in the form of isolated utterances. In most natural speech situations, errors are quite infrequent, so collecting errors as they occur necessarily involves excerpting them from the larger context. Laboratory-induced errors, on the other hand, often lack any meaningful context whatsoever. Sellen and Norman (1992:334–35) note that, although error research has contributed a great deal to our knowledge about language and about speech production, further progress will require a greater concern for ecological validity, the ‘real-world’ conditions in which speech occurs.

The data source for this paper was the Parallel Impromptu Narrations Corpus (S. Wells-Jensen 2003), which represents a cautious compromise between naturalness and experimental control in error collection. In a procedure adapted from Gable et al. (1992), subjects narrated a fast-paced animated cartoon, and transcripts were made of the narrations. The demands of the narration task caused errors to occur much more frequently than in normal speech, but in most other respects the PINC has been found to conform well to the characteristics of error corpora collected naturalistically (S. Wells-Jensen 1999).

On reviewing the transcripts, it was found that errors were not randomly distributed throughout the texts, but rather tended to occur in clusters separated by longer, error-free stretches of text. This previously-undetected clustering of errors is apparent in English, Japanese, Spanish, and Turkish data generated via the same narration technique¹.

1. METHOD. During the original data-collection phase, native speakers of Japanese, Spanish, and Turkish had been trained to detect speech errors in the recorded narrations in their respective languages. Final judgments on the status of non-standard utterances (e.g. as errors, hesitations, or restarts) and on the classification of errors had been made by Sheri Wells-Jensen.

The complete set of recorded narrations was later transcribed and coded by another group of native-speaker consultants, following the guidelines of the Child Language Data Exchange System (MacWhinney 2000), and most of the transcripts are now accessible online at www.bgsu.edu/departments/english/pinc/.

The distance, in utterances, between each pair of consecutive errors was calculated. Because it was not possible to consistently distinguish complex errors from multiple

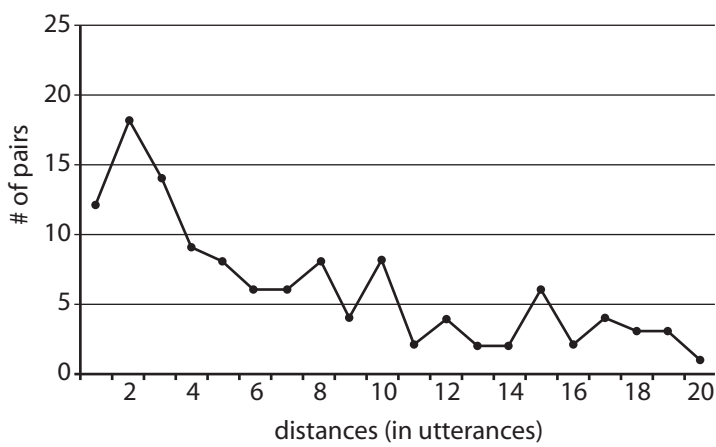


Figure 1. English inter-error distances.

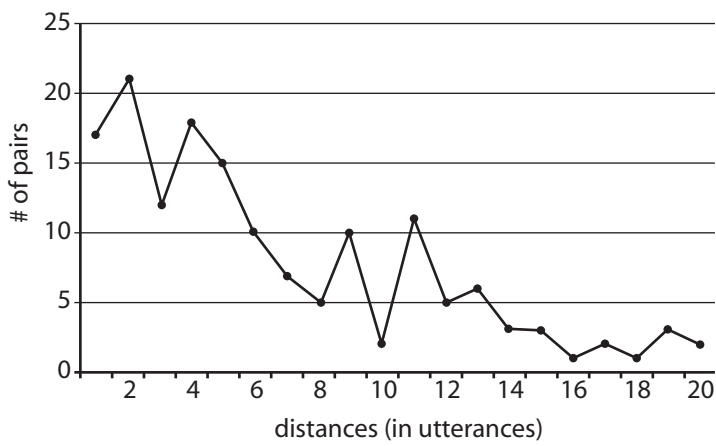


Figure 2. Japanese inter-error distances.

errors within a single utterance, each utterance which contained an error was counted only once; subsequent errors in the same utterance were disregarded, so no distances of 'zero' were recorded.

2. RESULTS. A plot of the combined inter-error distances for 12 English speakers is given in Figure 1. There is an apparent peak at 2; i.e., the most-frequent distance between consecutive errors in this corpus was two utterances. The corresponding plot for 12 Japanese speakers in Figure 2 exhibits the same pattern. If errors were distributed randomly throughout the texts, the mean inter-error distance for both languages would be approximately *ten* utterances. This result suggests two generaliza-

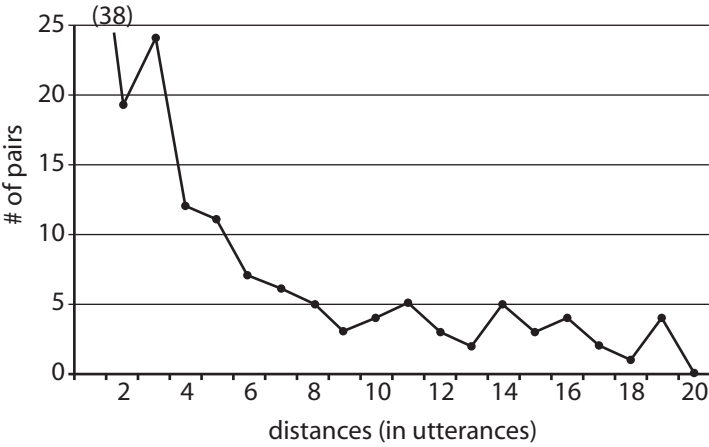


Figure 3. Spanish inter-error distances.

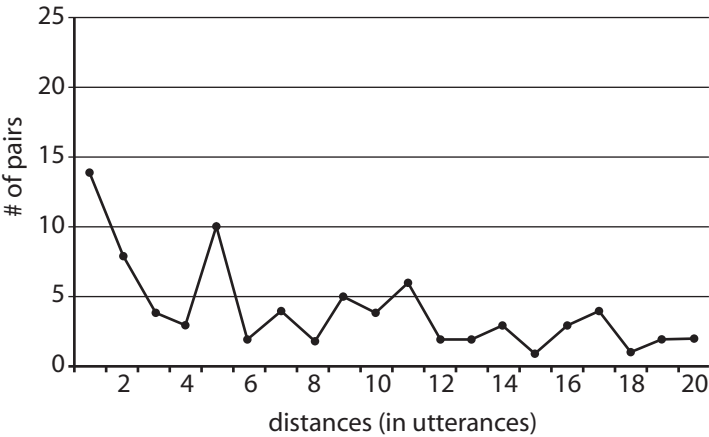


Figure 4. Turkish inter-error distances.

tions: Errors do tend to occur in clusters, but the clusters are not maximally tight². Each of these points will be addressed in turn in section 3.

Figures 3 and 4 give the plots for smaller samples of Spanish speakers ($n = 5$) and Turkish speakers ($n = 5$), which again suggest that errors tend to occur in clusters. Here there is no apparent evidence of a peak at 2, but these data sets are less representative than the English and Japanese samples. One of the Spanish speakers, for example, made an unusually large number of errors, which would have resulted in a rather small mean distance, whether or not the errors were randomly distributed.

3. DISCUSSION. Errors tend to occur much closer together than we would expect if their occurrence was random. Sellen and Norman (1992: 329–30) note that little

attention has been paid in previous research to the temporal distribution of speech errors, or to the possible influence of an error on a speaker's subsequent behavior. However, it seems reasonable to suppose that, in the context of a fast-paced narration task, subjects must allocate their attention partly to what they are currently saying, partly to what they will have to say next, and partly to other things that are going on while they are speaking. Noticing (and being annoyed or embarrassed by) an error may cause a cumulative increase in anxiety and a further decrease in attentional resources. In essence, then, committing one error may temporarily make it more likely that a subsequent error will occur.

As for how frequent error clustering is in normal speech situations, no one can yet be sure. Admittedly, in the 'real world', people are rarely asked to sit in a darkened room and provide play-by-play narration of a cartoon for the benefit of someone who doesn't even speak their language. It is easy to imagine, however, that committing an error while already distracted or under time pressure—a familiar state for many of us in the real world—could make subsequent errors more likely.

However, errors do not seem to occur maximally close together; an inter-error distance of one utterance is less common than a distance of two. This finding is reminiscent of a number of studies of errors in transcription typing, button-pressing, and other non-speech tasks (e.g. Rabbitt & Vyas 1970; Salthouse 1986), which report *post-error slowing*. That is, a temporary decrease in typing speed appears after an error is committed. This phenomenon has been characterized as a speed/accuracy trade-off, since slowing down after an error is detected should temporarily *decrease* the likelihood of a subsequent error. However, Sellen and Norman (1992:331) point out that this 'strategy' need not be conscious or volitional; slowing occurs whether or not the error is self-corrected.

We posit post-error slowing as a general cognitive strategy that may account for the latencies apparent in Figures 1 and 2. To the best of our knowledge, post-error slowing has not been directly measured in speech; however, it should be emphasized here that differences in both the physical nature of the typing and speech tasks and the standard experimental apparatus used in each research area make it much more feasible—and more common—to measure typing speed in milliseconds than to measure speech rate with comparable precision. Typing involves discrete finger movements that are approximately equivalent in duration and effort, and either a mechanical key or an electronic switch can be linked directly to a measuring device. Speech, on the other hand, consists of numerous overlapping articulatory gestures that can vary significantly in both duration and difficulty, and some of these gestures cannot be observed non-invasively³.

4. CONCLUSION. The clustering phenomenon seems to have been missed by researchers using traditional techniques of speech error collection, whether in the field or in the laboratory, since research on slips has tended to be 'almost exclusively... concerned with the *form* of errors' rather than with their temporal distribution (Sellen & Norman 1992:329). Current models do a good job describing the mechanics of speech production, including the production of errors, from a static perspective, as

if speakers were frozen in time, but they have only begun to capture the dynamics of speech. As we continue to refine our understanding of how real people speak in the real world of space *and time*, our models, and the ways in which we test them, must not only incorporate a new set of factors but also begin to emphasize a whole new dimension.

The serendipitous discovery of error clustering in the PINC highlights the importance of ongoing methodological refinement and innovation in speech-error research. Furthermore, the availability of directly comparable corpora of errors in different languages can afford us increasing confidence in our statements about universal characteristics of the human speech production system.

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- ¹ The analyses presented in S. Wells-Jensen (1999, 2003) include error data from Hindi, and the PINC will eventually include coded transcripts in Hindi as well. The Hindi transcripts were not finished at the time of this study, however, so Hindi inter-error distance data could not be included here.
 - ² The results presented here are not broken down in terms of error type (e.g. deletion, substitution, exchange) or level (e.g. phonological, morphological, lexical). There are at least two reasons for this: First, although there may turn out to be interesting differences in the clustering tendencies of different types of error, a preliminary investigation of lexical vs. non-lexical errors in the PINC (the preponderance of environmentally-mediated lexical errors being one of the characteristics that distinguishes this corpus most markedly from naturalistic collections) yielded no apparent difference. This may be partly a result of the rather coarse unit of inter-error distance we chose, which was nonetheless adequate for this simple demonstration of clustering. Second, because of the size and nature of the corpus, some error types simply were not present in sufficient quantities to allow confident comparisons.
 - ³ This is not to say that speech rate cannot be measured, of course. During the original analysis of the PINC (S. Wells-Jensen 1999), 'average' speech rates were calculated for individual speakers by counting syllables over two 30-second spans (corresponding to relatively fast-paced and relatively tranquil portions of the film), and it was found that this gross estimate of speech rate was positively correlated with total number of errors. However, speech rate can vary widely within a single narration, and finding a significant difference in local speech rate (over a span of perhaps one second) between post-error utterances and other utterances in the PINC might be impossible.

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ADVANTAGES OF PARALLEL TEXT ELICITATION: THE PARALLEL IMPROMPTU NARRATIONS CORPUS

SHERI WELLS-JENSEN
Bowling Green State University

UNTIL THE BIOLOGICAL SCIENCES offer another, more direct, method, the only way most linguists have of investigating the mechanisms that underlie speech production is to examine the output of the human speech production system at work. This rather prosaic approach has been used quite effectively for centuries, and the scientific community has accumulated a tidy body of knowledge through clever analysis and deduction. This success is due largely to very carefully choosing (or creating) the situations in which speech occurs, deciding what to listen for and, perhaps most importantly, determining to whom one should listen. Each choice, as it is made, significantly affects the body of data gathered, altering what can be learned.

Whether to choose a context in which to observe speech or to create conditions for speech or speech-like behavior to occur is the familiar tug-of-war between naturalness and controlled data collection. Controlled situations are appealing because they do afford investigators the chance to draw reasonably robust conclusions about the causes of events they study. In setting up such experiments, however, it is often necessary to sacrifice naturalness. Subjects might be asked to read specific, carefully crafted sentences aloud or manipulate words, sounds or phrases in preset ways, playing various kinds of language games (See Baars 1980 for a dozen such clever schemes concocted for the purpose of inducing errors in speech and Wells 1995 for some thoughts on applying these schemes to languages other than English.) Linguistics and psychology have learned a great deal from such studies, but there is always a sneaking uneasiness about the validity of the data used. They do not, after all, represent the speech production system in free flight, creating spontaneous utterances at the will of the speaker. Rather, these data reflect the system's ability to perform artificial tasks which will hopefully be equivalent or at least comparable to what it does naturally. (See Cutler 1981 and Stemberger 1985 for further discussion of the validity of laboratory-induced errors.)

The choice of what to listen for is often dictated by the initial selection of controlled elicitation techniques. If the speech situation is more natural, the investigator may focus on any number of aspects of the speech stream, limited only by his or her imagination and ingenuity. Traditional choices have included entire narratives, individual sentences, hesitations, restarts and errors in speech. When examined thoughtfully, all of these reveal aspects of the underlying mechanisms at work in producing speech. Speech errors in particular have been used for decades as a means of 'revealing the joints in the system' (Baars 1992) and their use is well-established in linguistics and psychology (Fromkin 1973, 1980; Levelt 1989; Meringer 1908; Stemberger 1983).

Choosing a set of speakers depends on the goal of the study. Unfortunately, investigators whose stated goal is the understanding of the 'Universal Human Speech Production System' often dramatically limit the scope of their data by choosing exclusively college-enrolled monolingual adult English speakers. There are practical considerations at play in these choices, but the choices do affect what can be learned from this subgroup of speakers. It's worth noting that most human beings alive today are not college educated, not adults, and are neither monolingual nor speakers of English.

Ideally, then, the investigator interested in a global understanding of speech production should collect data in every conceivable situation (with special attention to natural circumstances), in every language spoken and under as wide a variety of social conditions as possible. It would be unimaginably difficult, of course, to draw any conclusions from this unbridled symphony of language data unless it were possible to systematically select passages that differed from one another by only one significant variable (perhaps language spoken, age of speakers or some aspect of social context). Using these parallel bodies of data, it would be possible to isolate, and thus examine the effect of, each variable. Differences between these parallel passages could be attributed with some confidence to the interaction of universal speech production mechanisms with this single factor, be it the differing structures of the languages, educational level of the speaker(s) or constraints of the task.

As presented, this is, of course, ridiculous. No researcher or set of researchers could ever meet these requirements. However, it is possible to begin to approximate the ideal and thus gain many of the benefits of the use of parallel data.

The Parallel Impromptu Narrations Corpus (PINC), currently offered online at Bowling Green State University at <http://www.bgsu.edu/departments/english/pinc/> is a set of 83 parallel texts in five languages where social and situational factors were held constant across speakers. This paper discusses the methodology which produced the PINC and examines the resultant corpus for naturalness. The paper concludes with suggestions of how the methodology might be modified to meet the needs of other researchers and research questions.

1. THE PROBLEM WITH EXISTING DATA. As mentioned above, any investigator interested in speech production will quickly find that the vast majority of data gathered are elicited from monolingual English speakers. These data reveal much about the speech production system, but the information they provide must be treated with a degree of caution. They can tell us only how universal cognitive components deal with the intricacies of a single language. Whatever mechanisms human beings may have for coping with noun incorporation, complex agreement systems or rich case markings would remain forever hidden if the only tool scientists used were data from English speakers. Using only English data provides an extremely narrow view of the capabilities of the human speech production system. The fact that these speakers are almost always monolingual (in a world where bi- or multilingualism is the human norm) may further restrict the validity of these traditional data.

Still, even if a researcher wanted to take a broader perspective, comparing data across languages can be quite problematic unless the myriad of variables that influence speech production and the gathering of data are carefully accounted for (if not controlled).

When beginning the search for cross-linguistic corpora of speech errors, one might initially be delighted to find that corpora are easily available in Mandarin (Wan 1999) Korean (Min 1997), German (Meringer 1908) and English. These were, in fact, the first four corpora that came to the attention of this investigator. Initial euphoria quickly diminished as the details of the manner of collection and context of the errors came to light.

The Wan corpus is a collection of now over 1,000 Mandarin slips of the tongue, most of which were made by Mandarin-English bilinguals studying in the US. These were collected in free conversation by the experimenter, who has considerable linguistic expertise, using the traditional pad-and-pen method, where errors are quietly recorded as they occur.

Min's Korean corpus differs from Wan's collection in several key ways. The errors were collected from presumably bilingual Korean-English speakers attending Korean-language church services in the US. The investigator taped church services and reviewed the tape later to transcribe errors that occurred. Although both corpora are solid pieces of research on their own terms, there are differences between them which makes their comparison problematic. First, the context was different (formal vs. informal, partially scripted vs. free conversation). Kawachi (2002) has shown that these contextual differences affect relative proportions of kinds of errors at both the phonological and the lexical level. (See also Dell 1990; Dell, Burger & Svec 1997; Schwartz et al. 1994.) Secondly, Min had the leisure to play the tape several times, most certainly affecting the kinds of errors detected and the detail with which they could be transcribed.

The classic Meringer corpus is a very large collection (over 8,000) of slips of the tongue made by native, probably mostly monolingual German speakers. This collection was made in the very early 20th century, and it was thus done with the traditional pad and pencil method used by Wan in her Mandarin collection. Errors were drawn both from casual conversation and from more formal (though presumably unscripted) departmental meetings. Except for the fact that these are monolingual speakers, Meringer's work might be roughly comparable to Wan's if one finds no barrier in the time which passed between the two collections. (There is, after all, little reason to assume that the human speech production system and therefore the errors it permits had evolved dramatically in the intervening 91 years.) However, closer examination of historical accounts of Meringer's collection techniques might give one pause. Where Wan collected errors as covertly as possible (not disrupting the flow of talk around her), Meringer was notorious for interrupting the conversation and demanding explanations, insights and additional personal data from the one who committed the error. Meringer kept a record of the age, gender, profession, general health and even birthdates of the involuntary coparticipants in his studies,

and his aggressive interview techniques and willingness to bring any social event to a screeching halt in order to collect his data made Meringer (according to Sturtevant 1947) 'the most unpopular man at the University of Vienna.' It's impossible to say what impact this may have had on the data, but it is difficult to ignore the dramatic differences in the data-gathering styles and the potential for affecting the social circumstances under which the data were gathered.

The fourth corpus of several hundred English errors was gathered by this author using techniques quite similar to Wan's. However, the researcher used data from classroom lectures. One particular instructor turned out to be such a prolific source of errors that the researcher later found that over 50% of her corpus consisted of errors from this single speaker. There is some indication (Wells-Jensen in preparation) that there are, in fact, individual styles of speech production which emerge when patterns of errors from different individuals are compared. This English corpus seemed to have fewer phonological and morphological errors than either the Meringer corpus or other English corpora. This may be due to the over-representation in the data of that single speaker, who may have either an unusually efficient phonological encoder or a markedly error-prone lexical selection device--or perhaps both! Thus, a corpus which contains a majority or even a plurality of errors from one person (a common though seldom-discussed occurrence, since many researchers are good accountants of their own errors) cannot readily be compared with one where errors are contributed more or less equally by a wide variety of speakers.

Even when corpora appear to be superficially comparable, closer inspection often reveals substantial reason for hesitation. Before looking for similarities or differences between collections of errors in speech or other linguistic phenomena across languages, one might well wish for a system to control both the context in which the speech occurred, the number of speakers used in each corpus and the techniques for its collection, so that real differences between corpora can be correlated with some kind of explanation.

2. A NEW METHODOLOGY FOR ELICITING SPEECH ERRORS AND OTHER DATA. This particular set of parallel narrations was designed so that language would be the only significant factor differentiating the groups. College-enrolled native speakers of English, Hindi, Japanese, Spanish and Turkish were selected¹.

The paradigm used in this study is similar to one developed by Gable et al. (1992). Subjects were told to narrate a rapidly-paced video. The video's sound was muted both to avoid confusion and to facilitate recording. The video selected was the last thirteen minutes of Dr. Seuss's *The Cat in the Hat* (Playhouse Video 1989). This stretch of film contains the most colorful and interesting sequences of events in the movie, including a variety of attempts by oddly-shaped creatures to use a fish as a hockey puck, football and kite; a dazzling display of hats from an array of countries; and the appearance of an automatic cleaning machine that comes to sweep up the resultant mess. The film was also chosen for speech error research because the action, although varied and occasionally quite odd, was neither too frenzied nor too sedate. Pilot studies showed

that, when presented with a film that was too fast, subjects resorted to summary statements like 'The coyote's just running all around the house' rather than trying to keep up with the individual actions, giving them enough time to self-edit and decreasing the amount of errors found. Similarly few errors occurred in slower-paced films where subjects clearly had enough time to think to avoid slips.

Subjects were instructed to speak as rapidly as possible in their native language and to explain the action on the screen as if they were radio sports broadcasters. At first, there was some concern that this particular instruction would be problematic. It was thought that different cultures might view the role of the sports announcer differently, or that men and women might respond differently to this instruction. Further, it was felt that having subjects role-play a radio announcer might predispose them to use sentence fragments and isolated phrases rather than connected discourse. To help prevent this, and to further clarify the task at hand, subjects were presented with sample narrations before they began the experimental task. These narrations, which were in the subjects' native language and described a completely different film, were unrehearsed and rapid. They contained a great many restarts and hesitations (just as the subjects' own narrations would) but did not have any kind of exaggerated sports-announcer style. Each lasted about three minutes.

Subjects were told to speak so that if the tape of their narration were played for another native speaker of their language, the listener would get a clear picture of events on the screen as they unfolded. Explicit permission was given to the subjects to say anything relevant that might come to mind, including filling in space by describing colors and facial expressions, or by making hypotheses about future actions or internal states of the characters, or even by complaining that the action was too weird to put into words. They were told that if they stopped speaking for any extended period of time, the experimenter would ring a bell, indicating that they should begin speaking at once. Though some speakers were more hesitant than others, it was only necessary to resort to the bell on one occasion.

Each tape was reviewed by the principal investigator and a native speaker who had been trained in the detection of errors in speech and given specific guidelines for disambiguating errors in speech from other, similar phenomena. The 1,280 categorized errors that emerged are called the Cat Tales Corpus; the database containing these errors will also eventually be available at the PINC website. Full transcripts of each tape were later made by a different native speaker whose work was compared with the initial documented errors to help check the accuracy of the original transcription of these errors.

3. CHARACTERISTICS OF ELICITED DATA. The PINC data are a collection of 83 narrations, roughly 17 each in English, Hindi, Japanese, Spanish and Turkish, transcribed using CLAN format (MacWhinney 2000) with 1,280 speech errors annotated throughout. Half of the narrations were done by male adults, and half by female adults.

Although this paradigm allows speakers a certain amount of freedom of expression, it can hardly be called wholly natural. Thus, it would be useful to compare data

elicited in this way with data from more natural discourse to see what distortions, if any, are introduced by the task.

Although no specific measure of syntactic complexity was used, it is clear from a superficial inspection that the PINC contains a large proportion of short, unadorned svo and sov sentences. The data also contain frequent self-interruptions, as the speakers abandoned one line of description to begin another when information on the screen changed. The data also contain a rich assortment of filled and unfilled pauses and false starts. Unlike natural discourse, errors were frequent. Errors occurred at a rate of 1.1 per minute (or one error every fifty seconds), a pace that held constant across all five languages.

The speech errors themselves were examined carefully to see if this methodology distorted the kinds of errors made. The errors made were tested against a number of 'characteristics of naturally occurring speech errors' compiled by Berg (1987), e.g.:

- Phonological anticipations are more common than perseverations.
- Phonetic similarity is important in consonant exchanges, anticipations and perseverations; phonetically similar segments are more likely to interact with one another than are dissimilar segments.
- Phonological substitutions are more common than additions.
- Inflectional errors are more common than derivational errors.
- After a morpheme shifts position within an utterance, the allomorph appropriate for the new environment is chosen.
- Open-class whole-word errors outnumber closed-class whole-word errors.
- Paradigmatic word substitutions do not violate lexical category.

All of the English errors in the PINC corpus conformed to these expectations. Since the methodology limited the complexity of the syntax, no measures of syntactic errors were carried out. Except for variations in relative amounts of some kinds of errors (see below) there were no differences between the kinds of errors made by speakers in the PINC and those that occur naturally.

In corpora of naturally occurring errors, phonological slips account for around 60% of total errors (Nooteboom 1973). This may be due to speakers' relative inattention to the phonological level of speech (Levelt 1989: chapter 12), coupled with the sheer number of units involved when putting the phonological string together. Note that several segmental decisions must be made for each lexical choice, and each selection is a potential error.

The overall percentage of phonological errors in the PINC data is 28%, not quite half of what is found in naturally occurring slips, while lexical errors amount to some 56% of the data.

An explanation for this finding may begin with the specific requirements of the task. Subjects essentially translated visual information into spoken information. They often substituted a word appropriate for one thing they were seeing with a word appropriate for another, producing errors such as 'the *cat* jumped back into the fishbowl' or 'the *fish*

is waving his paws around'. Of the 103 paradigmatic substitutions of one open class lexical item for another in English, 67 (or 65% of such errors) can be characterized as resulting from this sort of environmental contamination. (See Harley 1984 for a discussion of these environmentally mediated errors). Factoring out these errors does not by itself deflate the number of lexical errors to the same level found in natural speech, nor does it increase the relative number of phonological errors to the expected level. The elicitation technique must have caused difficulties in the lexical selection component per se. The overload of information inherent in the task must cause activation of many more lexical items than could be used, and the lack of time to choose properly probably contributed to this skewing of the data toward lexical errors.

These characteristics set the PINC data slightly apart from collections of wholly natural slips, but the results generally conform to the patterns found in naturally occurring data. In any case, the purpose of this method of data collection was to assemble a set of parallel corpora which could be directly compared with one another. Any distortion introduced by the elicitation method will impact all of the data, presumably in the same way. The data might be less natural than the ideal but they are still comparable.

4. FUTURE DIRECTIONS. The existing 83 narrations that currently comprise the PINC could represent the beginning of a larger body of comparable data. The methodology can be used with different languages or populations, or for sociolinguistic investigations. Speakers performing the narration task might be given specific directives; for example, 'narrate this film as if you were speaking to a child.' Pairs of subjects might be given the task together to see how they interact and share responsibilities. If all the resultant data were transcribed and made available to other researchers, each could serve as a control (or touchstone) for the next variation. For further information about the methodology or about contributing data to the PINC, contact the author.

¹ Since all of the Hindi and Turkish speakers and nearly all the Japanese and Spanish speakers were bilingual, subject selection could have been improved by choosing only English speakers who were also bilingual.

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COGNITIVE STRATEGIES IN RELATIVE CLAUSE PROCESSING IN ENGLISH AND CHINESE

HUI YIN
University of Alberta

IN THE PAST a few decades, the study of language processing has occupied an important position in psycholinguistics. Great efforts have been made in the psycholinguistic field to discover the nature of mental representations and the 'cognitive operations and computations' (Libben 1996:407) in language use. With the development of generative grammar and its dominance in the linguistic field, much of the psycholinguistic research into comprehension and production was predicated on the grammatical (transformational) complexity of a sentence. Chomsky (1965) maintained that a model of language processing must necessarily contain generative grammars as central components.

The centrality of generative grammars as the basis for language processing was finally questioned by some functionally oriented approaches and others (e.g. Reber & Anderson 1970; Baker, Prideaux & Derwing 1973). Some psycholinguists (e.g., Kimball 1973; Prideaux & Baker 1986) argued that it is not the more abstract underlying level of syntax but aspects of surface structures which are most central to language processing. Other functionally oriented psycholinguists have suggested that language users employ a set of cognitive strategies in language processing (e.g., Bever 1970: 279-62; Slobin 1973; Kimball 1973; Prideaux 1982:23-26; Prideaux & Baker 1986:9-48). Directed by such approaches, research has been conducted to examine the roles that cognitive strategies play in language processing. Much of this research focuses on a number of cognitive strategies such as Closure, Markedness, Parallel Function, Bracketing, and Non-ambiguity. Research in this area has mainly come from three sources: naturalistic observations (e.g., C. Smith 1970:109-33, Limber 1973); elicited imitation experiments (e.g., M. Smith 1974, Slobin & Welsh 1973, Kawashima 1980, Stojanovic & Goodluck 1995); comprehension studies (e.g., Sheldon 1974, Lynkowsky 1980, Slobin & Bever 1982, Prideaux & Baker 1986, Lee 1992, Miyamoto 2000). The results of this research generally support cognitive strategies.

However, previous research to explore the nature of cognitive strategies was mainly based on Indo-European language data. If the strategies are universal as they are claimed to be, languages with different structures should be tested. English and Chinese are quite different in structures such as the flexibility of word order and the position of relative clauses. Though there are some studies (e.g., Prideaux & Baker 1986:63-109) from English which generally support cognitive strategies in language processing, very few investigations have examined cognitive strategies in Chinese syntactic processing. It is not clear whether such strategies are operative in Chinese processing. In this study, English and Chinese are tested for the effects of cognitive strategies in their relative

clause processing, because English and Chinese are very different in relative clause structures. This paper focuses on testing two prominent cognitive strategies: Closure and Markedness in English and Chinese relative clause processing, for Closure and Markedness are perhaps the best known and best understood of the cognitive strategies that have been proposed.

1. COGNITIVE STRATEGIES TO BE TESTED IN THIS STUDY. A cognitive processing strategy is a procedure 'which a language user employs as he processes language' while he attempts to construct a meaning representation (Prideaux & Baker 1986:26). A cognitive strategy is grounded on the cognitive make-up of the language user and thus could be considered universal. Strategies are based on cognitive constraints such as short term memory limitations, attention focus and the relative expectedness of structures.

Closure (e.g., Slobin 1973, Prideaux 1982:23–26, Prideaux & Baker 1986:26–33) is motivated by memory limitations. In language processing, the language user attempts to close a unit (e.g., phrase, clause) as early as possible. A unit which resists early closure is harder to process than one which allows early closure. A non-interrupted sentence is easier to comprehend than the one which is interrupted internally because a non-interrupted sentence allows early closure (MacWhinney & Pleh 1988:passim, Lee 1993:55–60).

The following examples from English and Chinese illustrate the distinction between interruption and non-interruption of sentences by relative clauses which have become the main structure to test Closure. (Chinese *de* is the RC marker.)

- (1) a. He met the neighbor [who sold his car]. (non-interruption)
 S V O Relative Clause (RC)
 b. The neighbor [whom he met] sold his car. (interruption)
 S RC V O
- (2) a. [*Ta jiandao de*] *nawei linju maideaole qiche.* (non-interruption)
 [He met *de*] the neighbor sold car
 RC S V O
 'The neighbor whom he met sold his car.'
 b. *Ta jiandaole [maideaole qiche de] nawei linju.* (interruption)
 He met [sold his car *de*] the neighbor
 S V RC O
 'He met the neighbor who sold his car.'

Two important structural differences between English and Chinese should be noticed. One difference concerns relative pronouns and the other is about the positions of relative clauses. English relative clauses have overt relative pronouns except that, when the pronoun is the object, the relative pronouns can be optionally deleted, i.e., in some instances we encounter a gap rather than a relative pronoun. However, Chinese does not have overt relative pronouns. Thus the NP in question always takes

the form of a gap. As for the positions, English relative clauses follow the modified nouns, whereas Chinese relative clauses must precede their head nouns. Chinese RCs are usually indicated by the overt relative marker *de*. Obviously, both English and Chinese have interrupting relative clauses. In English, an interrupting relative clause modifies the subject of the main clause as in (1)b, while in Chinese, it modifies the object as in (2)b. In this study, I select two languages quite different in relative clause structures to test Closure and Markedness and expect to gain cross-linguistic evidence to support these strategies.

Why is it harder to process an interrupted sentence? This is mainly due to memory limitations. When processing an interrupted sentence, processing on the main clause must be suspended and placed in a memory file while the subordinate clause is dealt with, and then processing on the main clause is resumed. Such a memory store is not required when processing a non-interrupted sentence and in that case language users are able to close the first clause and then incorporate it into the second (main) clause.

Markedness (e.g., Prideaux & Hogan 1993:397–99, Steriade 1995:passim) is based on relative expectedness of structures. The language user assumes that the unit being processed is in its normal (unmarked) form unless it is marked to the contrary. In syntax, clauses in normal word order are easier to process than those in marked word order. The following examples from English and Chinese are illustrations of syntactic unmarked and marked distinctions:

- (3) a. He has sold that old car. (normal word order: SVO)
 b. That old car he has sold. (marked word order: OSV)
- (4) a. *Ta maile naliang jiu qiche.* (normal word order: SVO)
 He sold that-classifier old car
 ‘He has sold that old car.’
 b. *Naliang jiu qiche ta maile.* (marked word order: OSV)
 That-classifier old car he sold
 ‘He has sold that old car.’

The normal (unmarked) word order in both English and Chinese is SVO. Thus, in both English and Chinese, sentences (3)a and (4)a are expected to be easier to process than their marked counterparts (3)b and (4)b. The unmarked (normal) structures tend to have less presupposition and are relatively more frequent and more expected. Obviously, there are special circumstances in which the marked forms are used (Prideaux & Hogan 1993), but such circumstances are more specific and more presuppositional.

2. EXPERIMENTS. Two relative acceptability judgment experiments were conducted: one in English and one in Chinese. The experiments were designed to examine the roles Closure and Markedness play in relative clause processing in English and Chinese. Most psycholinguists have assumed that judgments of relative acceptability can be influenced by processing factors (e.g., Prideaux & Baker 1986:64–65). According to

this assumption, naturalness and acceptability judgments vary with relative processing ease, other things being equal. The more difficult a sentence is to process, the less acceptable it will be judged.

The two hypotheses to be tested are the following:

Hypothesis 1: According to Closure, a non-interrupted clause is easier to comprehend than the one which is interrupted because a non-interrupted clause allows early closure and thus it does not 'impose a burden on short term memory' (Prideaux 1982:23).

Hypothesis 2: According to Markedness, a clause in unmarked (normal) word order is easier to process than one which is in marked word order because a clause in normal word order is more expected and more frequent.

2.1. PARTICIPANTS. The participants were 34 native English speakers studying at the University of Alberta, Canada and 103 native Chinese speakers studying at the Training Center, Zhejiang Normal University, China. The participants volunteered to participate in this study. Since there were more participants in the Chinese study I balanced the participants with the items by using fewer Chinese items (tokens) in each type than English ones, in order to have a better statistical comparison. Otherwise the Chinese study might display greater statistical power than the English one.

2.2. STIMULI. The sentence types to be tested are (1) Non-interruption/unmarked word order; (2) Non-interruption/marked word order; (3) Interruption/unmarked word order; (4) Interruption/marked word order. There were four items in each type in English and three items in each type in Chinese since there were more Chinese speaking subjects participating in the experiment.

In this study, Closure was tested by varying RC (relative clause) structures according to the location of the RC in the matrix clause and markedness was tested by varying word order in the RC. English RCs are right branching (RCs follow head nouns) while Chinese ones are left branching (RCs precede head nouns). If an RC modifies a subject NP, it interrupts the main clause in English but it allows early closure in Chinese. Markedness will be tested according to the grammatical role the relative pronoun (or gap) plays in the RC structure. In both English and Chinese, the unmarked word order is SVO. So if the relative pronoun serves as the subject of an RC the RC structure is in unmarked word order (SVO) and if it functions as the object of an RC the RC structure is in marked word order (OSV). Langacker (2002:14) claims that it is usually possible for the subject of a clause to be relativized, but there are fewer languages which also allow objects to be relativized.

For the sake of simplicity, in this paper I use two capital letters to stand for each type of RC structure, in which the first letter represents the grammatical function of the head noun and the second letter stands for the grammatical role of the relative pronoun or gap. Thus, we have four types of RC: SS, SO, OS and OO. The following

are the stimulus examples from English illustrated in (5) and from Chinese illustrated in (6):

- (5) a. (SS) The man [who beat the dog] bought a new car.
(interruption/unmarked: SVO)
b. (SO) The man [whom the dog bit] bought a new car.
(interruption/marked: OSV)
c. (OS) The woman has found the man [who beat her dog].
(non-interruption/unmarked: SVO)
d. (OO) The woman has found the man [whom her dog bit].
(non-interruption/marked: OSV)
- (6) a. (SS) *Zuotian shangwu da gou de neige ren maile yiliang qiche.*
[yesterday morning beat dog *de*] that person bought a car
The person who beat the dog yesterday morning bought a car.
(non-interruption/unmarked)
b. (SO) *Zuotian shangwu gou yao de neige ren maile yiliang qiche.*
[yesterday morning dog bit *de*] that person bought a car
The person whom the dog bit yesterday morning bought a car.
(non-interruption/marked)
c. (OS) *Ta pengdaole [zuotian shangwu da gou de] neige zhongnian ren.*
He met [yesterday morning beat dog *de*] that middle-aged man
He met the middle-aged man who beat the dog yesterday morning.
(interruption/unmarked)
d. (OO) *Ta pengdao [zuotian shangwu gou yao de] neige zhongnian ren.*
He met [yesterday morning dog bit *de*] that middle-aged man
He met the middle-aged man whom the dog bit yesterday morning.
(interruption/marked)

It can be seen from examples (5) and (6), SS and SO are interrupted sentence types in English while they allow early closure in Chinese. On the other hand, OS and OO allow early closure in English while they are interrupted sentence types in Chinese. Both in English and in Chinese, SO and OO are marked sentence types because the relative pronouns or gaps function as the objects and the word order of the RCs is OSV.

In this study, stimulus sentences were controlled for length and only very common lexical items were used so that any difference in ease of processing results from syntactic structures. The distractors were included so that participants would not easily recognize the task as a task on syntactic structures.

2.3. PROCEDURES. The stimulus sentences were presented to participants in written form. Before the list was presented to subjects the order of items had been randomized in order to minimize order effects. There were five categories regarding different degrees of acceptability for these sentences. In the experiments, 5 values (numbers) were

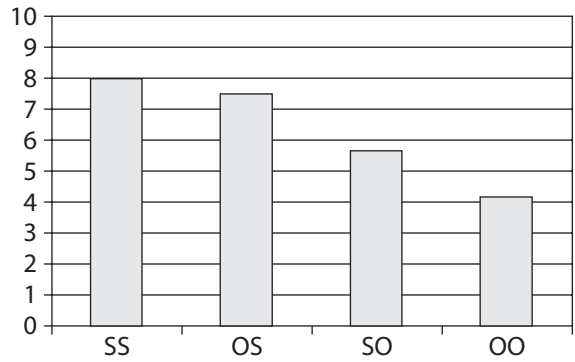


Figure 1. The means of 4 types, Chinese.

used to reflect the acceptability ratings of these five categories. The 5 values are placed beside each sentence and subjects were simply asked to rate the sentence by choosing a value corresponding to the acceptability of the sentence. Thus, subjects' answers are values rather than categories and these values are used for statistic analyses. The scaling system containing the five values for final statistic analyses is the following:

- 9 completely acceptable, sounds natural
- 7 relatively acceptable, but not as good as (9)
- 5 uncertain as to acceptability, cannot decide
- 3 relatively unacceptable, but not completely
- 1 completely unacceptable, sounds strange

First, subjects were asked to read the sentences once and indicate the most acceptable sentences and the least acceptable sentences respectively. This should have anchored the scale, which deterred participants from simply assigning the highest score to every or most sentences, as they are all grammatical (Prideaux & Baker 1986:74). Participants then were required to read each sentence and indicate a value. There were no time constraints and subjects could change their choices.

2.4. RESULTS AND DISCUSSIONS. Two-sample T-tests have been conducted to test the effects of sentence types in English and Chinese relative clause processing. The mean scores of the four sentence types in Chinese and English are illustrated in Figures 1 and 2. As these figures show, non-interrupted and unmarked sentences (SS in Chinese and OS in English) are judged most acceptable in both Chinese and English, while interrupted and marked sentences (OO in Chinese and SO in English) are judged least acceptable in both Chinese and English. Tables 1 and 2 indicate the T-test scores for the sentence types.

In Chinese, the differences between each sentence type are highly significant. In English, the differences between the sentence types except between OO

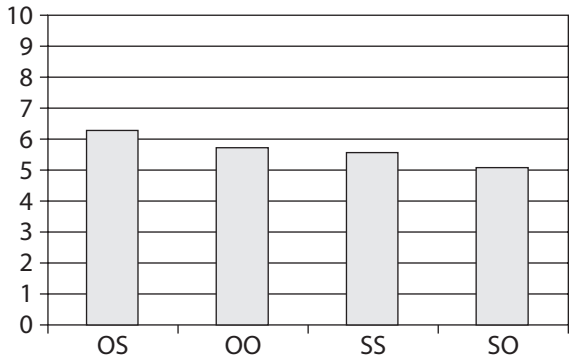


Figure 1. The means of 4 types, English.

Types	SS vs. SO	SO vs. OS	OS vs. OO	SS vs. OS	SS vs. OO	SO vs. OO
P-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 1. T-test value, Chinese. (SS non-interrupted/unmarked; SO non-interrupted/ marked; OS interrupted/unmarked; OO interrupted/ marked.)

Types	OS vs. OO	OS vs. SS	OO vs. SS	OO vs. SO	SS vs. SO	SO vs. OS
P-value	0.007	0.001	0.29	0.002	0.023	<0.001

Table 2. T-test value, English. (OS non-interrupted/unmarked; OO non-interrupted/ marked; SS interrupted/unmarked; SO interrupted/ marked.)

(non-interrupted/ marked) and SS (SS interrupted/unmarked) are significant. Therefore, the ranking of acceptability in Chinese is SS>OS>SO>OO while that in English is OS>OO, SS>SO (the symbol > indicates ‘being statistically greater than’). Next, we will collapse two types of non-interrupted sentences and two types of interrupted sentences in Chinese and English to test the effects of Closure.

Figures 3 and 4 (overleaf) show that non-interrupted sentences are really judged more acceptable than interrupted sentences in relative clause processing both in English and in Chinese. Therefore, Closure as a cognitive strategy is operative in both English and Chinese language processing.

Now, let’s collapse two types of marked sentences and two types of unmarked sentences in Chinese and English to test the effects of Markedness.

As illustrated in Figures 5 and 6 (overleaf), the differences between unmarked sentences and marked sentences in both English and Chinese are significant, which suggests that marked sentences are more difficult in relative clause processing. Thus,

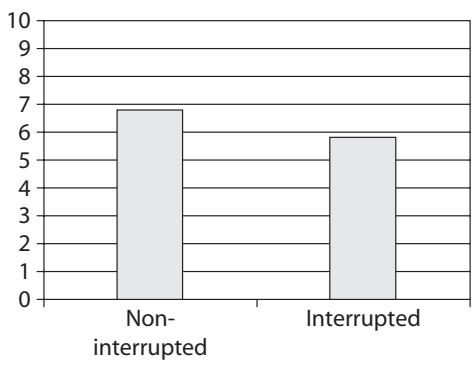


Figure 3. Effects of closure, Chinese. (SS & SO non-interrupted vs. OS & OO interrupted T-test $P<0.001$.)

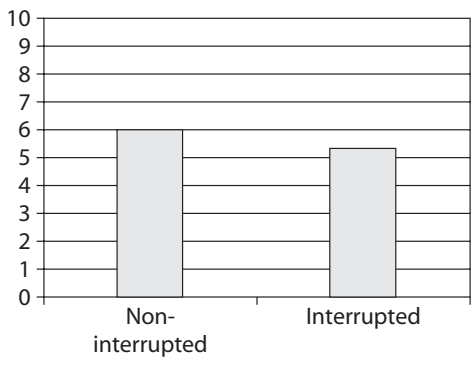


Figure 4. Effects of closure, English. (OS & OO non-interrupted vs. SS & SO interrupted T-test $P<0.001$.)

markedness as a cognitive strategy plays a role in relative clause processing in both English and in Chinese.

Though there are similarities in the role which plays in relative clause processing in English and Chinese an interesting difference between English and Chinese emerges when we carefully compare the means in Figures 1 and 2. In each of these figures, the first (the highest) ‘mean’ represents the easiest sentence-type, which has the simplest structure both in terms of the non-interruption of the matrix clause and in terms of the unmarked order of constituents of the RC, and the last (the lowest) ‘mean’ represents the hardest sentence-type, in which the matrix clause is interrupted and the RC has a marked order. Means 2 and 3, in both Figures 1 and 2, represent sentence-types which are intermediate in complexity, one of which exhibits interruption but has an unmarked RC order, while the other has a marked RC order but exhibits non-interruption of the matrix clause. It is when these two intermediate

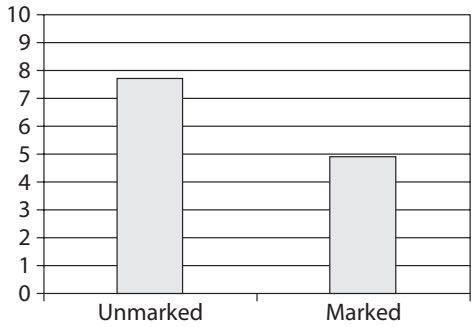


Figure 5. Effects of markedness, Chinese. (SS & OS unmarked vs. SO & OO marked T-test $P<0.001$.)

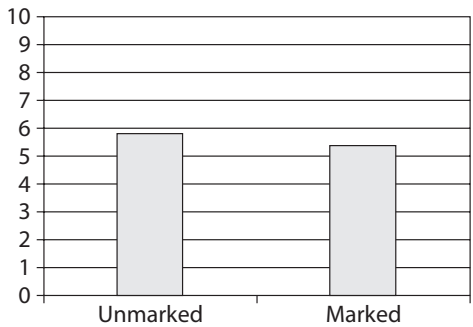


Figure 6. Effects of markedness, English. (SS & OS unmarked vs. SO & OO marked T-test $P<0.01$.)

means are compared, first in Figure 1 and then in Figure 2, that the interesting difference between Chinese and English can be seen. In Chinese there is a highly significant difference ($P<0.001$) between the two means in question, which indicates that in Chinese, interrupted sentences (OS) are judged more acceptable than marked sentences (SO) and that markedness in RC word order is more salient and plays a greater role in Chinese relative clause processing than interruption of the matrix clause. However, in English, there is no significant difference ($P=0.29$) between the OO and SS means. Therefore we can not claim any difference between Closure and Markedness in English RC processing. Maybe Closure and Markedness are equally salient and important in English relative clause processing.

3. CONCLUSIONS. A relative acceptability judgment study was conducted to test the effects of Closure and Markedness in relative clause processing in English and Chinese, which are quite different in relative clause structures. Closure as a cognitive strategy is operative in this study. This indicates that in both English and Chinese sentences

containing relative clauses which do not interrupt main clauses are really easier to process than those which interrupt main clause internally. In this study, Markedness is also supported, which suggests that in both English and Chinese processing relative clauses with unmarked word order is easier than processing those with marked word order. The results of this study also indicate that Markedness is more salient and plays a greater role than Closure in Chinese relative clause processing and that there are no significant differences in processing between marked sentences and interrupted sentences in English. All in all, cross-linguistic evidence from both English and Chinese has been obtained in this study and such evidence supports the claim that Closure and Markedness as cognitive strategies are not language-specific but really universal.

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A PRÉCIS OF HARD-SCIENCE PHONETICS-PHONOLOGY

VICTOR H. YNGVE
University of Chicago

GALILEO, in his *Dialogue Concerning the Two Chief World Systems—Ptolemaic & Copernican* of 1632, (Galileo 1967:53–54) has his spokesman Salviati say that ‘in the natural sciences, whose conclusions are true and necessary... one must take care not to place oneself in the defense of error.’ The pioneering work of Galileo and his contemporaries four centuries ago exposed errors inherited from Aristotle and the ancients and led to the spectacular rise of science and the vast increase of our knowledge of the natural world. The work of Galileo in laying the foundations of modern science deserves close study by all serious linguists. The founders of modern linguistics, also wishing not to place themselves in the defense of error, joined the scientific revolution about two centuries ago and today linguistics is defined in its textbooks as the scientific study of language.

1. LINGUISTICS AND SCIENCE. The founders of modern linguistics often started with an assumption that speech is segmentable into phonemes, phones, features, or some other units, or equivalently they transcribed it by symbols such as the International Phonetic Alphabet (IPA). It was generally realized, however, that such an assumption is actually false, but it was accepted tentatively anyway following Bloomfield (1933:78). Even though Twaddell (1935) soon pointed out that the phoneme was in reality only a convenient fiction, what was once tentative became permanent, not always that the segments were phoneme-sized, but that there was something out there that could be described or segmented (Bloomfield 1933, Hjelmslev 1953:9–10, Chomsky 1957:49). The usual assumption that remains, often tacit, is that speech itself is structured, that it is somehow more than simple unstructured acoustic energy flow. This assumption has also proved to be false, a fact that many linguists have known and sometimes acknowledged, but have often ignored in practice.

It is now possible through hard-science linguistics to put these false assumptions behind us and build linguistics on the same standard scientific foundations as biology, chemistry, and physics. You will find in the full version of this paper (Yngve, in press) an outline of a hard-science phonetics-phonology that helps to unify linguistics in a seamless and scientifically acceptable fashion all the way from social and pragmatic phenomena down to physiology and physics.

2. THE PHYSICS OF SOUND. Sound waves and the surroundings through which they propagate are aspects of communicating external to speakers and hearers. They are usually neglected in linguistics, but their consideration would seem to be necessary for understanding the interaction of people with each other and with their physical environment.

The various sound pressures produced by a speaker at different frequencies, and the various differently affected reflections, diffractions, and absorptions in the surroundings, plus the general noise level and interfering sounds from other people speaking, add to and mix with one another, resulting in a complex sound field where the sound pressure with time measured at any listener's position will generally include much more than, and be much different from, the sound waves measured at a speaker's mouth. Since people often talk and are understood in noisy and acoustically degraded surroundings, we conclude that resistance to noise is a characteristic of human communicating by means of sound waves.

3. THE BIOLOGY OF HEARING. Land creatures through the eons have been actively searching their environments for food, danger, mates and other objects important to their survival and these have been the factors that mainly drove the evolution of their hearing organs.

From the beginning of land animals, 400 million years ago, there were both afferent and efferent nerve fibers transmitting impulses from and to the ear. And from the very beginning the sensory hair cells of the ear had electrical tuning and active processes for frequency selectivity and amplification.

From about 120 million years ago all placental and marsupial mammals have had inner ears with coiled cochleas divided along their length by a basilar membrane. Arrayed along the length of the human basilar membrane are 12,000 outer hair cells in three rows which sense its vibrations through their hair-like stereocilia. These hair cells have both efferent connections from the brain and afferent connections to the brain and serve functions of amplification and frequency selectivity. There is also one row of 3500 inner hair cells that send the resulting signals to the brain.

Intensive research since about 1985 has revealed that when an outer hair cell detects motion in the basilar membrane at its particular frequency it responds by actively lengthening and shortening at that frequency thus feeding mechanical energy back into the basilar membrane so as to increase its amplitude of vibration at that place and at that frequency. (For references see the full version of this paper.) A hair cell coupled to the basilar membrane in this way exhibits the sharp tuning characteristics of a resonant feedback system. Consequently the mystery of how a person can distinguish so well between different close frequencies is solved. Each hair cell is looking for and responding actively to vibrations of the basilar membrane at its own particular frequency.

An animal that is subject to predation is actively listening for the sounds of predators and other dangers and distinguishing them from background noises. A predator hunting for prey or lying in wait is actively listening for the sounds expected of prey. In many species sound and hearing play a large role in attracting and finding mates and in defending a territory. There would be survival value in being able to carry out several of these and other important hearing tasks actively and at the same time.

An organism uses the differences in sound in the two ears to determine its direction and correlates and unifies the several related frequencies from each source; and

for each source, it takes into account systematic differences in pitch, sound quality, intensity, and position of the source for different sources of the same type. This has obvious evolutionary utility. The required neural mechanisms must have evolved over millions of years probably extending back at least to the earliest vertebrates. Some levels in the brain must serve the purpose of actively matching incoming sounds with expected sounds.

So with this heritage a person can separate out the sound of a clarinet from an orchestra or one person's voice in a small group even though the sound energy from the different other sounds overlaps extensively in frequency. These are tasks that instruments, lacking expectations, cannot carry out. Consequently phoneticians record voices and audiologists test hearing in sound-proof and anechoic chambers.

4. EXPECTATIONS. A mother is especially sensitive to the cry of her infant. One might say she is actively listening for it, even if she is sleeping. Perhaps this is innate in both the mother and the child. It is thought that the evolutionary transition of reptiles to mammals is marked by the nursing of infants, by a separation or isolation call when an infant is separated from its mother, and by the fact that mammals play.

Your friend hears a strange noise and says, 'What was that?' You listen and try to play back and search through the sounds you recently heard. 'What?' you say. After a pause he says, 'That.' This time you hear it and can tell him what you think it was. This requires a short-term echoic or playback memory that can retain a record of the uninterpreted sound energy heard. Then a search task is needed in the individual for comparing this with predictions of what would be expected from known source types. An echoic memory would also serve well for animals listening to environmental sounds and learning to make predictions about their environments important for their survival.

There is evidence that hearing and understanding speech operate by matching incoming sound with the sounds expected from others speaking. In a crowd of voices, a person is particularly sensitive to someone across the room speaking his name but does not take particular notice of other names being spoken.

When a person listens to someone speaking, there is usually a set of several or more expectations lying in wait and the incoming sound chooses among them. Often a person in a conversation can even predict and volunteer the very next word that the other person was about to say but cannot remember at the moment.

Comparing what is heard with expectations is part of a feedback mechanism for error detecting. When one hears something not expected, a different task is invoked to analyze further what was heard. This will involve searching for other possible expectations that might be satisfied by the incoming sound. And if a serious failure in communicating is detected, the listener can always ask for clarification.

When a syntactic example out of context is presented in class, the student will search desperately for a context in which it can be understood, or in the case of claimed ambiguity, to find a match with another context in which it can be differently understood.

Operating with expectations would greatly assist in understanding rapid or slurred speech or a foreign accent. One could fill in from expectations what was not distinctly heard. We can now understand how a person can extract a speech signal from noise so effectively. People expect to hear the sound of their language even though heard in noisy or acoustically degraded surroundings.

People learning a foreign language bring the expectations of their own language to the task and hear the distinctions of their own language. Then when they speak, they make the distinctions they have heard and end up speaking with a foreign accent. It is well known that one first has to learn to hear the foreign distinctions before one can produce them.

What a person does or says or understands depends on the context. The operative context is revealed as simply a continually changing web of expectations. We need to find out how these expectations are structured and how they change.

Hard-science linguistics theory, designed to replace the ancient semiotic-grammatical tradition as a properly scientific foundation for linguistics, is general-purpose enough to replace also our ancient static theories of sensation and perception by a dynamic theory of hearing involving expectations as part of the active processes of organisms struggling to survive in their environments. In this theory expectation procedures are constructed out of scientifically justified lower-level properties and elementary procedures that are potentially reducible to neuroscience (Yngve 1996).

5. THE STRUCTURE OF EXPECTATIONS. In science we regularly distinguish between the part of the real physical world modeled and our testable model or theory of that reality, which we can formalize as a *system*.

Consider a formal meeting following parliamentary procedure. The assemblage of persons attending the meeting can be represented or modeled in theory as a system called a *linkage*. We can call this particular linkage system [meeting].

Systems are characterized by *properties*, some of which may be *task procedures*. The internal structure of task procedures, expectation procedures, and other types of procedures are given in Yngve (1996). When the meeting is transacting business, we can say that the [meeting] linkage is carrying out a task procedure <transact business>. When the meeting is transacting business, we say it is open. We model this as the [meeting] linkage having a property <open>.

Consider a person attending this meeting as a member. We set up a system called a *role part* to represent in theory the part that this member plays in the meeting. We can call this role-part system [member].

The task procedure executed in the [member] role part when the member is attending the meeting can be called <attend>. This <attend> task in the [member] role part is carried out by carrying out a sequence of subtasks:

- <time> involving waiting for the time for the meeting to start;
- <take seat> involving the member taking a seat in the hall;

- <come to order> involving the member's part in the meeting coming to order; and
- <transact business> involving the member's part in transacting the business of the meeting.

There is no problem in using the same name 'transact business' for the linkage task procedure and for the role-part task procedure, as they are properties of different systems. Similarly, the [member] role part can have a state property called <open> to represent the member's part in the [meeting] linkage state property <open>.

We can write this analysis of the <attend> task in the [member] role part as:

<attend> = <time> → <take seat> → <come to order> →
 <transact business> ? <open>.

Let us now look at the member's task <come to order>. This involves parallel expectations. Having taken his seat the member expects either the presiding officer to stand <expect stand> or to hear the sound of the rap of the gavel <expect rap> or the assemblage to become quiet <expect quiet>. When any of these occurs, the member becomes quiet <be quiet> and expects to hear the presiding officer call the meeting to order <expect call to order>.

We can write this as:

<come to order> = <expect stand>, <expect rap>, <expect quiet> →
 <first done> → <be quiet> → <expect call to order>.

Note that context is handled in the expectations. If the presiding officer in the context of a formal meeting stands when he is expected to open the meeting, the assemblage becomes quiet. If he were to stand in some other context or in this context at some other time when not expected, it would probably be ignored.

This type of analysis is not just invented on the basis of whim or intuition. Expectation procedures, although they do make intuitive sense, are carefully introduced as constructs in a scientifically justified physical-domain theory. This stands in stark contrast with various grammatical theories and notations that it may appear superficially to resemble. The resemblance can be a guide in reconstituting linguistics as a hard science, but one must beware at every turn of the many pitfalls connected with domain confusions and the lack of scientific justification within the grammatical tradition.

Now consider the member's task <expect call to order> in which the member expects to hear the presiding officer call the meeting to order. This involves hearing the sound of the presiding officer calling the meeting to order and trying to match it with expectations. Turning to the standard manuals for examples of what might be expected, we can model this in the [member] role part as:

<expect call to order> = <(sound heard from presiding officer)> +
 <expect sound of 'The meeting will come to order'>,
 <expect sound of 'The meeting will be in order'>,
 <expect sound of 'The meeting will please be in order'>,
 <expect sound of 'The Eighty-third Annual Meeting of the House of Delegates
 of the American Dental Association is now convened'> →
 <match> N <try again> Y →

The task <expect call to order> involves the member actively listening for the presiding officer to call the meeting to order. It can be seen as involving the focus of attention of the member on the presiding officer and what the presiding officer might say, which can be seen as a lower level of the member's focus of attention on the meeting through his task <attend>.

The task procedure <(sound heard from presiding officer)> involves the evolutionarily advantageous ability of animals being able to localize and unify the various sounds from the same source and relate them all to the same set of expectations taking into account systematic differences in pitch, sound quality, intensity of the source for different sources of the same type, as the men's or women's voices of different presiding officers.

The results of no match, N, leads to executing a task procedure <try again>, the details of which could be analyzed at a lower level, and the results of match, Y, leads to the next task after the completion of <expect call to order>, which is the <transact business> subtask of the <attend> task as above.

Consider now the several parallel subtasks <expect sound of '...'>

It may be that one or another of the possibilities will be remembered and recognized as a whole as in rote memory. But it is likely that the longer ones or perhaps all will not be remembered as a whole, but recognized in terms of separate sequential and possibly hierarchically structured expectations.

This sort of recognition is a version of analysis by syntheses as explored in considerable detail in Neisser (1967), but here it is freed from grammar and consequently the domain confusions have been removed that were revealed in attempts to test the depth hypothesis and the needed ability to handle all contextual and pragmatic effects has been added.

The question then arises, for each of the possibilities, what is the structure of the expectations different people might have (or the same person at different times) that would lead to recognition? How far down would the structure of tasks and subtasks go?

We can measure the capacity of the evolutionarily advantageous short-term echoic memory discussed earlier that can retain a record of the uninterpreted sound energy heard.

Many writing systems around the world are based on the syllable. That casts some doubt on the psychological reality of phoneme-sized expectations.

The intuition that speech is segmented is an observational phenomenon about people, and particularly about linguists and about literates. Any structuring projected

on heard speech is in the person's task hierarchy and its expectations. Consequently, these intuitions can provide us with information on expectations, but it must be used with the utmost care. Remember that we're not studying people's intuitions, a logical domain enterprise; we're studying how people communicate, a physical-domain enterprise. We must be extremely careful to avoid the domain confusions lurking here.

In one family that I knew, a child, after a long silence said, 'Mommy, Daddy, I know why they call it the forthajuly. Because it's the fourth of July!' Other such hints of learning in terms of fairly long segments are easily available.

We can't ignore hints from phonemic theories. Within these, problems have arisen that have led to considerable work relevant to hard-science linguistics, particularly in the study of prosodic effects, vowel harmony, consonant harmony, and 'suprasegmental' phenomena, and many others.

6. SPEAKING AND LEARNING TO SPEAK. Although all or nearly all of the properties of hearing needed to support speech have evolved during a hundred million years, a modern larynx and vocal tract that can support speaking, on the other hand, has evolved only within the last few hundred thousand years (Lieberman 1991:73).

An ability to speak is not needed for understanding speech. Some animals can learn to understand a bit of speech. It has been reported that a child physically unable to speak can learn to understand the speech of others.

Although communicating is a cooperative endeavor, an account that assumes phonemes or other smaller or larger segments starts with a discussion of producing these segments in speaking and then moves on to consider the listener and the distinctions he can hear. This makes sense if one assumes segments and follows the flow of causality and the directions of the arrows in Saussure's famous illustration of the speech circuit (1955:27).

But in hard-science linguistics we are freed from this assumption. We can follow evolution in our account and start with hearing. And if we were to follow the development of the child, we would again have to give priority to hearing, since a child has to learn to hear the distinctions of speech before he can learn to produce them.

Play is characteristic of all mammals. Babbling is an aspect of play. It gives the child practice in controlling the vocal tract in a nonsocial setting where the child has auditory feedback and can compare the sounds he makes with his memories of sounds he has heard.

A child is embedded in a physical and social environment, its circle of linkages. Linkage theory allows the representation of complex overlappings and interactions of groups and of groups of groups all the way up to the largest complexly structured communities and their various observed interactive overlaps.

Learning to speak is a social process involving for a child the pragmatic real-world consequences of his own attempts at speaking and of the speaking of the others he observes. From this he learns to understand and to speak.

Speaking tasks are parallel to hearing tasks, in that the child or the adult hears himself speak. This allows for the facilitating effect of monitoring, a kind more advanced

than the child's monitoring of his babbling in that it requires a memory for two plex structures: the structure of tasks and expectations involved in the child's attempt and the structure of tasks and expectations involved in his hearing and understanding the monitoring feedback, and of course a mechanism for comparing the two and making judgments of same or different. This is a memory for interpreted speech in contrast to the memory for the uninterpreted speech of babbling. Thus we account easily for the difference well-known to language teachers between imitating and repeating the speech of another person.

Other mammals imitate their mothers in matters important for survival such as where to go, what to eat, and what to be afraid of. The child's attempts at imitating the speaking of others may be rewarded by success in the child-mother linkage and in linkages with other persons. However, analogy is also involved and the child's gradual learning of the distinctions that make a pragmatic difference in its life.

The exciting work on task dynamics promises a hard-science method for analyzing the control of the physical gestures of speaking (Hawkins 1992, Munhall and Jones 1995). The tasks of task dynamics would be seen as subtasks of hard-science-linguistics tasks and this would work well since hard-science linguistics has a built-in method of handling time delays.

7. WHAT IS INNATE? It is only properties of real-world organisms in the physical domain that can be innate, i.e. inherited in the genes. Hard-science linguistics moves the question of what is innate into the physical domain where it can actually be investigated scientifically.

We have seen that ears and the related neurological equipment are not passive devices. They are active dynamic organs and have been from the very beginning of land animals. They are biologically adapted to scan, search for, and analyze significant environmental sounds in a complex and ever-changing sound field that has come to include even the sounds of other persons speaking. An impressive evolutionary continuity is revealed.

Let us now consider Chomsky's so-called 'innateness hypothesis'. It is formulated not in the real-world physical domain where ordinary biological evolution takes place, but in the non-real logical domain where there is no possibility of testing theories or hypotheses scientifically. We can say with certainty that Chomsky's 'Universal Grammar' is not innate because it is formulated in the logical domain where nothing is real and nothing can be innate. It is not a scientific hypothesis at all and cannot be taken seriously by scientists.

8. CONCLUSION. How far has science come since Galileo? There is no hesitation today in accepting the methods and findings of modern science in the physics of sound, the biology of the ear and the vocal tract, and related ecological and evolutionary considerations even including animal communication.

But at the mere mention of a person speaking or understanding speech, suddenly standard science goes out the window and we find ourselves not much beyond the

philosophical speculations of Aristotle and the ancient Stoics. It is unacceptable in what aspires to be a science to continue to study the convenient fictions of classical phonology and support an approach to linguistics that embraces false assumptions and invents its own objects of study. We can do better than that.

I am not arguing for yet another brand of grammar but only that after two centuries we finally accept modern standard science. Galileo worked to replace the ancient and inadequate Aristotelian philosophical tradition as a foundation for physics and astronomy by a modern scientific foundation. We must now work to replace the ancient and inadequate Aristotelian-Stoic semiotic-grammatical tradition as a foundation for linguistics by a modern scientific foundation.

To argue for standard science should not be controversial among linguists: Our goal for two centuries has been to build a linguistic science. And to maintain intellectual integrity and openly defend the search for scientific truth against a false but widely held and strongly entrenched ancient philosophical tradition should not take nearly as much courage in the twenty-first century as it took Galileo in the seventeenth.

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LANGUAGE INDEX

This index contains references to languages, language groupings (families, subfamilies, etc.) and scripts (writing systems) or other methods of language representation as they are analyzed or otherwise mentioned in the text (excluding glosses and other incidental uses of English and the International Phonetic Alphabet). Language names are in **bold face**, language groupings are in **BOLD SMALL CAPS**, and names of scripts of other language representation systems are in *bold-italic*.

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